DENMARK'S NATIONAL STRATEGY FOR SUSTAINABLE DEVELOPMENT
A SHARED FUTURE – BALANCED DEVELOPMENT

INDICATOR REPORT

THE DANISH GOVERNMENT

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Indicator report
Denmark's National Strategy for Sustainable Development
"A shared future – balanced development"

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1. Indicators for sustainable development

This is the first indicator report which elucidates and illustrates progress in achieving sustainable development. The indicators have been chosen on the basis of objectives and activities in the National Strategy for Sustainable Development "A shared future – balanced development", and on the basis of proposals and views expressed in the public debate concerning sustainable development.

The indicators in this publication and the indicators to be developed in future will constitute an important element in ongoing reporting of developments and results in connection with objectives and activities in Denmark's National Strategy for Sustainable Development. The indicators will be part of the basis for assessment in the regular adjustments of objectives and activities. The indicators show developments within the various action areas of the strategy.

The target group for the Danish set of indicators for sustainable development is wide and varied. Effort has been made to present the indicators in a manner which is professional, yet accessible. We hope that the indicators can be used by politicians, trade organisations, business organisations, scientists, green organisations, and interested citizens alike.

1.1. Indicators

Indicators are a valuable tool for elucidating developments, identifying challenges and monitoring implementation and results, but they do not bring any changes in and of themselves.

Definition: *An indicator can be defined as a parameter which illustrates developments of a condition or a context in relation to realising important objectives or initiatives.*

Indicators contain information in a less detailed and often more aggregate form than data and statistics. Known examples of indicators which are often used to describe developments in society would be the gross national product and the unemployment rate, which can be used to describe a country's economy and labour market. As regards the environment, one indicator would be the application frequency, which can be used to describe the impact of pesticides on the environment. Indicators for sustainable development are wider in scope than the traditional economic indicators or environmental indicators, because they also focus on issues such as consumption, resources, Genuine Savings, and a decoupling of the correlation between economic growth and environmental impacts.

1.2. Indicators at international, regional, and local levels

Indicators are increasingly being developed and applied as tools for decision makers and the general public. Development of environmental indicators, sector indicators, and indicators for sustainable development is carried out internationally as well as in local and regional forums. Some of the most important players at the international level are: the OECD, the UN Commission on Sustainable Development (CSD), and the European Commission (Eurostat and the European Environment Agency). Other important players in the development of indicators for sustainable development include the World Bank, the World Resources Institute, the Worldwatch Institute, Baltic 21, the Nordic Council of Ministers, and a range of NGOs.

Development and use of indicators for sustainable development in the *EU* is carried out in accordance with the Sixth Environment Action Programme, the Cardiff Process on integrating environmental considerations in EC policies and activities, and the EU strategy for sustainable development.

A common feature of the development and application of indicators in the EU is that the indicators should provide information about economic, social, and environmental development as a basis for political decisions. The implementation of the EU targets for sustainable development must be monitored by means of a wider set of indicators.

The Commission's memorandum for the European Council meeting in Gothenburg firmly established that at present, we do not have a set of indicators which matches the objectives in the EU strategy for sustainable development. As a result, focus is placed on developing indicators for sustainable development. In its annual reports, the Commission must evaluate the implementation of the strategy for sustainable development on the basis of a number of so-called headline indicators. This first took place at the Council's meeting in Barcelona in March 2002.

The UN's work with indicators (CSD) as a follow-up to Agenda 21 has, among other things, resulted in a list of 58 indicators for sustainable development which cover the chapters in Agenda 21. This is to say that the CSD indicators cover the environment, social issues, economics, and institutional issues. In 2001, Eurostat tested the UN's set of indicators for sustainable development for the EU Member States. This test showed that approximately half the indicators were deemed to be directly relevant to the EU.

At the Ministerial Council Meeting on sustainable development held in May 2001, the *OECD* ministers for finance, economic affairs, and the environment decided that the OECD should develop and reach agreement on indicators for sustainable development and decoupling. The indicators must be integrated in the OECD's assessment of the Member States' environmental and economic policies. The OECD will present its report about the progress made at the World Summit in Johannesburg.

The Danish set of indicators is based on inspiration from international sets of indicators, so it is possible to make comparisons with developments in other countries within areas where this is relevant. The international development of indicators will continue to influence the Danish sets of indicators in future. Consequently, work will be carried out regularly to incorporate indicators developed at international levels where this is relevant. Denmark will work to ensure that the international indicators are meaningful when seen with Danish eyes. The Government does, however, regard it as important that Denmark has its own set of indicators linked to the Danish National Strategy for Sustainable Development.

In Denmark, a number of counties and local authorities are establishing indicators for sustainable development as part of their local Agenda 21 work. The national set of indicators can be used for inspiration for regional and local work. This increases the opportunities for comparing developments at local and national levels.

1.3. How are the indicators linked to the strategy?

Denmark's National Strategy for Sustainable Development contains overall objectives for achieving sustainable development. It also contains objectives and activities for selected, specific action areas that are central to achieving sustainable development. The indicators have been chosen to facilitate elucidation and illustration of developments in relation to important objectives or initiatives in the National Strategy for Sustainable Development.

The Indicator Report comprises two parts:

- An overall set of indicators (*headline indicators*) which describe developments and results in relation to the general Strategy objectives for sustainable development. This set comprises 14 indicators, and the set will be updated every year.
- A detailed, specific set of indicators which addresses individual action areas, describing developments and results in relation to some of the Strategy objectives and activities. This set of indicators will also be updated every year.

The indicators are based on solid specialist knowledge with documented preconditions and methods applying to all indicators. The data basis of the indicators is also available. The data will be corrected in accordance with recognised practices. For example, a number of indicators will be normalised on the basis of weather indices. This first set of indicators has been established on the basis of what is feasible in the short and semi-short term. It is expected that the set of indicators will be developed further as better data become available, or as new objectives and activities become significant for achieving sustainable development.

2. Contents of the report sections

The selected indicators will be presented in the following sections. These sections largely follow the structure of "A Shared future – balanced development". The indicators are presented in a schematic form and are related to selected objectives and activities from the Strategy.

Section 3 presents a summary assessment based on the headline indicators. It will also present the set of headline indicators associated with the eight overall objectives and principles of the Strategy for Sustainable Development.

Sections 4 to 16 introduce specific indicators for each of the strategy action areas – within sectors as well as within cross-sectoral approaches. Each of these sections contains an introductory text which relates to the long-term objectives from the Strategy itself. This text is followed by a table which contains references to specific objectives and activities. It also presents the indicators selected to elucidate objectives and activities. In areas where there is a need to develop further indicators, a supplementary text describes the perspectives for developing such indicators.

Section 17 contains references to further reading about indicators for sustainable development.

3. Headline indicators

The Danish vision of sustainable development is based on eight objectives and principles:

- The welfare society must be developed and economic growth must be decoupled from environmental impacts
- There must be a safe and healthy environment for everyone, and we must maintain a high level of protection
- We must secure a high degree of biodiversity and protect the ecosystems
- Resources must be used more efficiently
- We must take action at an international level
- Environmental considerations must be taken into account in all sectors
- The market must support sustainable development
- Sustainable development is a shared responsibility, and we must measure progress

1. The welfare society must be developed and economic growth must be decoupled from environmental impacts

Denmark has enjoyed good and stable economic development. From 1990 to 2001, GDP per capita grew by approximately 22 per cent. This corresponds to an average rate of increase of approximately two per cent per year.

For many years, increases in GDP and increasing negative impacts on the environment have been closely linked. This link has been decoupled for emissions of greenhouse gases and acidifying substances. These emissions have fallen slightly during the period 1990 to 2000, while GDP has increased steadily since 1993. This indicates that economic growth and environmental impacts have been decoupled.

The indicator "Genuine Savings" can be used when assessing the value of economic, social, and environmental resources. "Genuine Savings" constitute an economic indicator for the development of the total wealth of a society. When combined with the other indicators, "Genuine Savings" can provide a picture of whether the development during any given year is sustainable. The "Genuine Savings" in Denmark have increased slightly throughout the last six to seven years. It should, however, be noted that the "Genuine Savings" indicator is still being developed, and that it must be supplemented by analyses of what constitutes critical impacts on health, nature, and the environment. In particular, it should be noted that no value can be assigned to a number of environmental impacts, and so these impacts are not included in the indicator.

Denmark is characterised by a very high rate of employment compared to other countries. Since the mid-1990s, employment in Denmark has risen significantly, with an additional 200,000 people (approx.) entering the labour market. This means that further, significant growth in employment would be an ambitious goal. The challenge becomes even greater in view of the fact that demographic developments will, all other things being equal, reduce the labour force in the years to come.

2. There must be a safe and healthy environment for everyone, and we must maintain a high level of protection

The Danes live longer again. During the last five years, the average life expectancy has increased as much as it did during the preceding 21 years. Men have added 1.7 years to their average life expectancy from 1995 to 2000, whereas the corresponding increase for women is 1.2 years. The increase has been so significant that in 2000, the average life expectancy of Danish men corresponded to the target figure for 2004. In 2000, women's life expectancy was as high as the 2002 target figure. Only three other EU Member States have experienced greater increases in life expectancy after 1995.

In 2000, Denmark's total emissions of greenhouse gases were at 1990 levels after having peaked in 1996. Emissions have fallen within a number of sectors. For example, emissions from agriculture have fallen by approximately 14 per cent, which is mainly due to the implementation of the Action Plans for the Aquatic Environment. Emissions from households have fallen by approximately 19 per cent, which is mainly due to more efficient energy consumption, and emissions from the waste sector fell by almost nine per cent during the period. By contrast, emissions from the transport sector grew by almost 18 per cent. Emissions from the commercial sector have gone up by almost seven per cent, which is due to e.g. greater energy consumption. In order to reduce Denmark's emissions of greenhouse gases, the goal is to incorporate all reduction opportunities for greenhouse gases in the most cost-effective manner. There is a need for special efforts to reduce emissions of greenhouse gases from the transport sector and the commercial sector.

Classification of chemicals is an important part of the work carried out to ensure a high level of protection, so that the environment is safe and healthy for everyone. A common EU classification of substances and substance groups creates a basis for common risk management. The number of classified substances and related substances has doubled since 1993. At the end of 2001, the classified substances accounted for a total of approximately 7,000 substances out of the 100,000 substances which are or have been available on the European market.

3. We must secure a high degree of biodiversity and protect the ecosystems

A high degree of biodiversity must be ensured, and the ecosystems must be protected. One goal is to increase the extent of Danish woodland areas so that forests will cover 20-25 per cent of Denmark. From 1950 to 2000, the total woodland area has grown steadily. The area of original forest has fallen, while the area of deciduous forest is now once again on the rise after having fallen for some time. The objective is to increase the area of deciduous forest and to retain the areas of original forest. The total area accounted for by meadows, dry grassland, moors, and marshlands (open natural habitats) has diminished during the period 1950 to 2000. In 2000, the total area accounted for by these natural habitats was only approximately half that of the corresponding 1950 figure. The efforts to increase the area of the open natural habitats meadow, dry grassland, and moor have not had any discernable impact in the latest inventories.

4. Resources must be used more efficiently.

For some indicators, Danish consumption of resources has fallen. After a period of strong growth from 1995-96, both energy consumption and consumption of drinking water have fallen up until 2000. There has been a relative decoupling of energy consumption and consumption of drinking water from economic growth during the period 1996 to 2000. Waste volumes fell during the period 1996 to 1999, but this was primarily due to a reduction in the waste volume from power plants and from the building and construction sector. If these two sectors are excluded from our considerations, the waste volume grew from 1997 to 1998. The total waste intensity (waste generation seen in relation to GDP) fell from 1996 to 1999, but it increased again from 1999 to 2000 as a result of greater waste volumes.

5. We must take action at an international level

Denmark lives up to the goal of contributing to combating poverty in the world. The Danish objectives for promoting global, sustainable development are closely linked to the international development targets set by the UN, and they support these targets. During the period 1992 to 2001, Denmark contributed approximately 1 per cent of its GNI every year, which is far more than the UN target of 0.7 per cent of GNI. In 2001, environmental assistance accounted for approximately 0.09 per cent of GNI, and this figure has increased in 1999 to 2001.

6. Environmental considerations must be taken into account in all sectors

Concern for nature and the environment within the sectors of society is elucidated in the indicator report

by showing the environmental profile for some sectors. In 2002, profiles for the energy and transport sectors will be shown.

As regards the *energy sector*, CO_2 emissions have been reduced during the 1990s. This is partly due to greater use of natural gas and renewable energy. More efficient use of combined heat and power generation has also reduced CO_2 emissions. The energy sector almost exclusively emits the greenhouse gas CO_2, but this accounts for more than 45 per cent of Denmark's total emissions of greenhouse gases. In total, energy consumption accounts for almost 80 per cent of Denmark's emissions of greenhouse gases. Total energy consumption has increased by 8 per cent since 1988, while emissions have increased by almost 3 per cent. The energy produced is used in a more efficient manner. Energy consumption and emissions have not increased at the same rate as economic growth during the period. As regards acidifying substances, SO_2 emissions from the energy sector have fallen by more than 70 per cent during the period 1990 to 2000. NO_X emissions have been reduced by approximately 40 per cent.

Within the *transport sector*, total transport activities increased by 17 per cent for passenger transport during the period 1990 to 2000. During the period 1990 to 1999, freight transport increased by 16 per cent. The total growth is primarily caused by increases in motorised road transport. The transport sector accounts for a growing share of Denmark's total emissions of greenhouse gases (CO_2), which increased by 18 per cent during the decade 1990 to 2000. Transport emissions of CO_2 have largely followed the rate of economic growth. In Danish towns, traffic is the greatest source of air pollution. Despite mounting traffic, emissions of the pollutants NO_X, NMVOC, and CO have fallen. This is due to the 1990 requirement stipulating that new petrol-powered cars must have catalytic converters. Emissions of SO_2 have fallen by 72 per cent as a result of the rules on lower sulphur content in diesel. The pollutants from traffic are mainly nitrogen oxides (NO_X), hydrocarbons (NMVOC), sulphur dioxide (SO_2), and carbon monoxide (CO). For all other emissions, the link between economic growth and the environmental impact of transport has been successfully decoupled. It is likely that emissions of NO_X, NMVOC and CO will continue to fall until all petrol-powered cars are fitted with a catalytic converter.

7. The market must support sustainable development

Sustainable development and economic growth are not mutually exclusive. Enterprises which do a lot of work for the environment tend to have a competitive edge.

The increase in the number of eco-labelled products available shows that there is a market for environmentally friendly products. This also shows that the market can be used to support sustainable development. The increase in the number of eco-labelled products has been particularly pronounced in recent years, and in 2000, more than 2,350 eco-labelled products were widely available. The most commonly seen eco-label is the Swan label (the Nordic eco-label), but the Flower (the EU eco-label) is making good progress. In 1999, only two products bore the Flower, and in 2000 the corresponding number was seven. In 2001, however, the number of Flower-labelled products grew to 54.

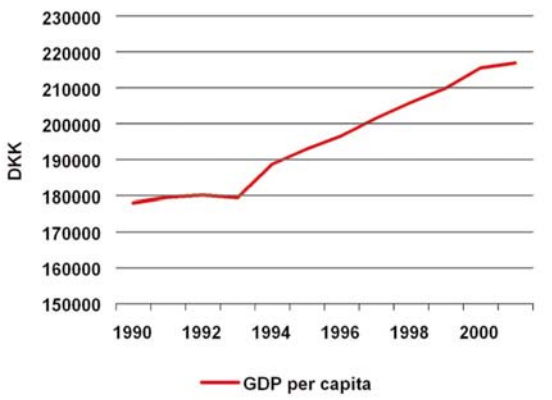
8. Sustainable development is a shared responsibility, and we must measure progress

Environmental management is one way of integrating environmental concerns into production. In this manner, enterprises assume responsibility for ensuring a more environmentally friendly production chain. Since 1994, the number of enterprises with certified environmental management in the form of EMAS and ISO 14001 has increased year by year. Denmark is among the European countries which have the greatest number of EMAS registered enterprises compared to the size of the population (surpassed only by Austria). Developments in the number of EMAS and ISO registered enterprises show that it is possible to use environmental concern as a competitive parameter.

Indicator N1:

GDP per capita

Source: Statistics Denmark



This indicator elucidates Denmark's economic development. The figure shows the gross national product at constant prices per capita during the period 1990 to 2001. The use of constant prices means that account has been taken of changed prices, which in turn means that these figures reflect the actual development of production in Denmark.

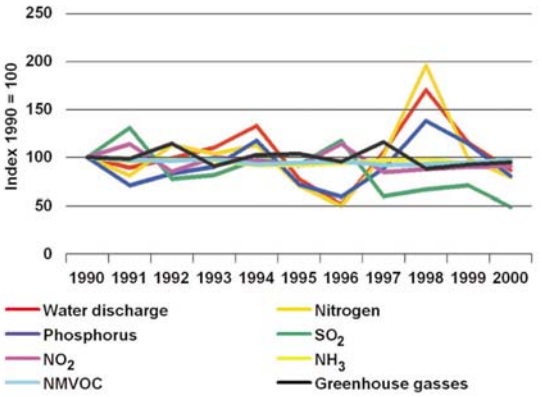
The development of GDP per capita reflects market trends. From 1990 to 1993, production per capita was approximately DKK 180,000. From 1990 to 2001, GDP per capita rose by slightly more than 22 per cent. This corresponds to an average rate of increase of approximately 2 per cent per year. In 2001, GDP per capita was DKK 217,026.

As GDP is expected to continue to grow, it is central that economic development be decoupled from increasing pressure on resources. Within a number of areas, the link between economic growth and increased pollution has been successfully decoupled. Even so, great challenges remain within other areas that are important to health, nature, and the environment. The increase in GDP per capita indicates growing wealth. Increasing wealth improves the opportunities for ensuring sustainable development in future – e.g. in the form of greater savings and more investments in cleaner technology.

Indicator N2:

Decoupling illustrated by environmental impacts for 4 factors (greenhouse gases, runoffs of nutrients into the sea, emissions of acidifying compounds and emissions to air) in relation to GDP

Source: The National Environmental Research Institute, Denmark; Statistics Denmark



This indictor elucidates developments in relation to the objective of decoupling economic growth from impacts on the environment. The figure shows the development in emissions of greenhouse gases, runoffs of nutrients into the sea (N and P), and emissions of acidifying compounds (and emissions to air total emissions in relation to GDP.

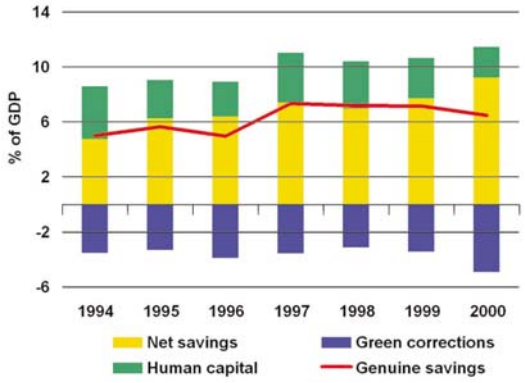
Generally speaking, emissions of nitrogen and phosphorus have fallen since 1990. There is, however a correlation with water runoffs, which means that the considerable increase in water runoffs from 1997 to 1999 has also caused greater nitrogen runoffs during that period. Emissions of greenhouse gases and acidifying substances have fallen slightly during the period 1990 to 2000. At the same time, GDP has grown steadily since 1993, which indicates that economic growth and impact on the environment have been decoupled. Besides emissions of NMVOC caused by humans, there are several other NMVOC sources. Thus, the total impact on the environment is larger than the impact illustrated in the figure. Since the effort for decoupling is focused on emissions caused by humans, these emissions are illustrated in the figure.

Generally speaking, developments within selected parameters are headed in the right direction in relation to the objective of decoupling growth and environmental impacts.

Indicator N3:

Genuine Savings

Source: The Ministry of Finance



"Genuine Savings" is an economic indicator for developments in the total wealth of society. This means that the concept is used to determine the value of economic, social and environmental resources. When combined with the other indicators, genuine savings can provide a picture of whether development during any given year is sustainable. The "Genuine Savings" indicator covers the financial net savings (i.e. savings less depreciations) plus savings in terms of human capital (e.g. in the form of training at workplaces), less the use of natural resources (oil and gas reserves) and the negative effects of emissions of greenhouse gases and a number of pollutants. All of these elements are assigned a monetary value. However, the "green corrections" only incorporate the effects on nature and environment to which a monetary value can be assigned. This means that a number of effects are not included in the scope of this indicator.

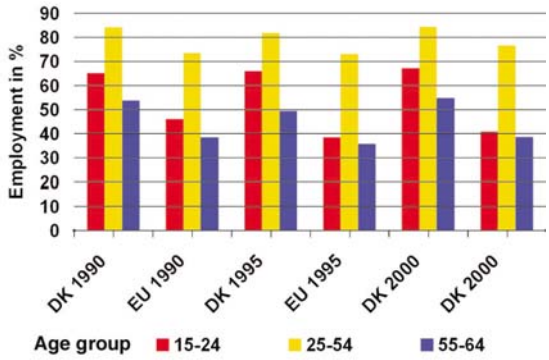
The "Genuine Savings" have shown a slight upwards tendency throughout the last six to seven years. No calculations for this indicator can be made before 1994 onwards. The main reason that the green corrections increased in 2000 is the higher price assigned to extraction of oil and gas in the North Sea, brought on by the increase in the price of crude oil. This factor is, however, more or less cancelled out by increasing financial net savings.

The objective is to consistently maintain positive genuine savings, so that the financial net savings and the savings in terms of human capital provide a contribution which surpasses the value of the green corrections. It should be noted that the "Genuine Savings" indicator is still being developed, and that it must be supplemented by analyses of what constitutes critical impacts on health, nature, and the environment. In particular, it should be noted that no value can be applied to a number of environmental impacts, and so these impacts are not included in the indicator.

Indicator N4:

Employment analysed by age groups

Source: The OECD, Employment Outlook



This indicator elucidates social aspects of sustainable development. Since the mid-1990s, employment in Denmark has risen significantly, with an additional 200,000 people (approx.) entering the labour market. Denmark is characterised by a very high rate of employment when compared to other countries. This means that further, significant growth in employment would be an ambitious goal. The challenge becomes even greater in view of the fact that demographic developments will, all other things being equal, reduce the size of the labour force in the years to come.

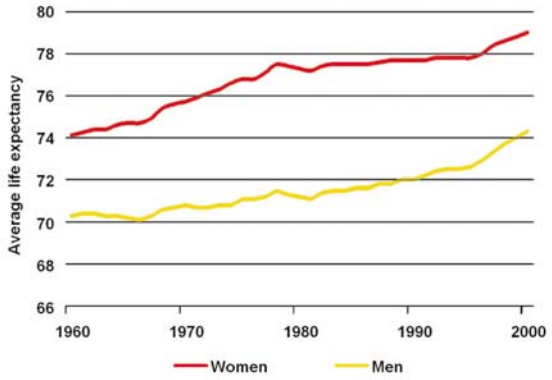
Nevertheless, continued growth within employment is a crucial prerequisite for realising the Government's objective of ensuring that there is room for growth within the commercial sector and funding of welfare services. Increased employment constitutes an important contribution towards realising the objectives of the Government's overall growth strategy, which is to create the best possible basis for growth in production and employment through growth-focused structural policies.

If the Government's economic policy strategy is to be realised, the requirement is that increased labour-market participation and lower unemployment rates must create the basis for increased employment corresponding to additional employment for 87,000 individuals during the period 2000 to 2010. At its meetings in Lisbon and Stockholm, the European Council established ambitious targets for employment rates within the EU up until 2010. The targets are an employment rate close to 70 per cent of the population within the working age, an employment rate of more than 60 per cent for women, and an employment rate of 50 per cent among the 55 to 64 year-old age bracket. Denmark already meets these objectives, but has, as was mentioned above, established national objectives for further increases in the employment rate.

Indicator N5:

Average life expectancy (men and women compared)

Source: Statistics Denmark, 2001



This indicator elucidates aspects of the state of health in Denmark.

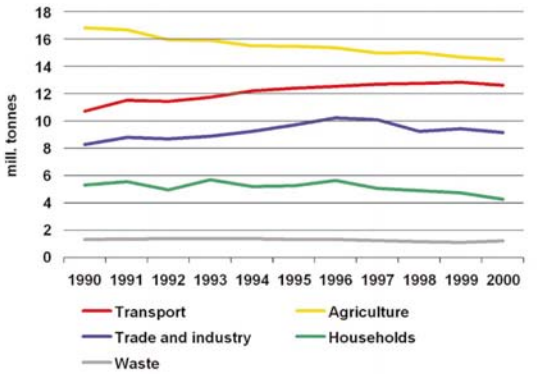
The average life expectancy of Danish men has gone up from 70.3 years in 1960 to 74.3 years in 2001. The average life expectancy of women has risen from 74.1 years in 1960 to 79.0 years in 2000. Men added 1.7 years to their average life expectancy from 1995 to 2000, whereas the corresponding increase for women was 1.2 years. During the last five years, the average life expectancy has increased as much as it did during the preceding 21 years.

The increase has been so significant that in 2000, the average life expectancy of Danish men corresponded to the target figure for 2004. In 2000, the women's life expectancy was as high as the 2002 target figure. Only three other EU Member States have experienced greater increases in life expectancy after 1995.

Indicator N6:

Gross emissions in million tonnes CO_2 equivalents analysed between industry, transport, households, agriculture, and waste

Source: The National Environmental Research Institute, Denmark



This indicator elucidates the contributions to emissions of greenhouse gases made from Danish sectors. The figure shows Denmark's emissions of greenhouse gases during the period 1990 to 2000, both in total and by sector. The distribution by sector corresponds to the one used in "Climate 2012", the Ministry of Energy and Environment, March 2001. Denmark's base year under the Kyoto Protocol comprises the 1990 emissions of CO_2, N_2O, and CH_4 as well as the 1995 emissions of HFCs, PFCs, and SF_6. This indicator does not extend to Greenland and the Faeroe Islands.

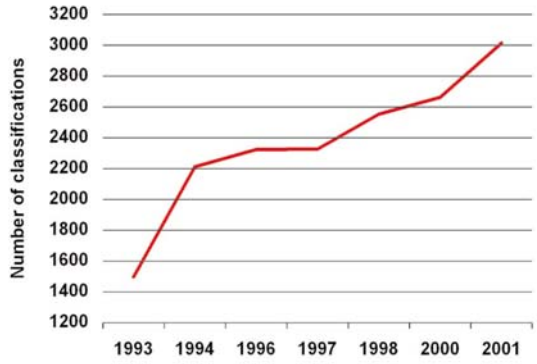
In 2000 the total emissions corresponded to 1990 levels after having peaked in 1996. Emissions from the transport sector grew by almost 18 per cent, mainly due to economic development. Emissions from agriculture fell by approximately 14 per cent, which is mainly due to the implementation of the Action Plans for the Aquatic Environment. These plans served to reduce nitrogen emissions, thereby also reducing nitrous oxide (laughing gas) emissions. Emissions from the commercial sector have increased by almost 7 per cent, which is partly due to greater energy consumption, and partly due to the increasing use of HFCs as a cooling agent as an alternative to cooling agents which degrade the ozone layer. Emissions from households are down by approximately 19 per cent, which is mainly due to more efficient energy consumption and to the fact that consumers change from individual heating systems which use oil to systems which use natural gas, or to district heating. Emissions from the waste sector, which in this context extends only to methane emissions from landfills, are down by almost 9 per cent. This is mainly due to the 1997 ban on depositing degradable waste and to the increasing collection of methane from landfills for energy purposes.

The objective is to incorporate all reduction opportunities for greenhouse gases in the most cost-effective manner possible. As the figure shows, there is a particular need to reduce emissions within the transport sector and the commercial sector.

Indicator N7:

Number of chemicals which have been classified.

Source: The Danish Environmental Protection Agency



This indicator elucidates the efforts to maintain a high level of protection, so that the environment is healthy and safe for everybody. The figure illustrates developments in common EU classifications of substances and substance groups. The figure does not include substances which have been self-classified by manufacturers. At the end of 2001, approximately 7,000 substances had been classified out of the total of 100,000 substances available on the European market, either now or in the past.

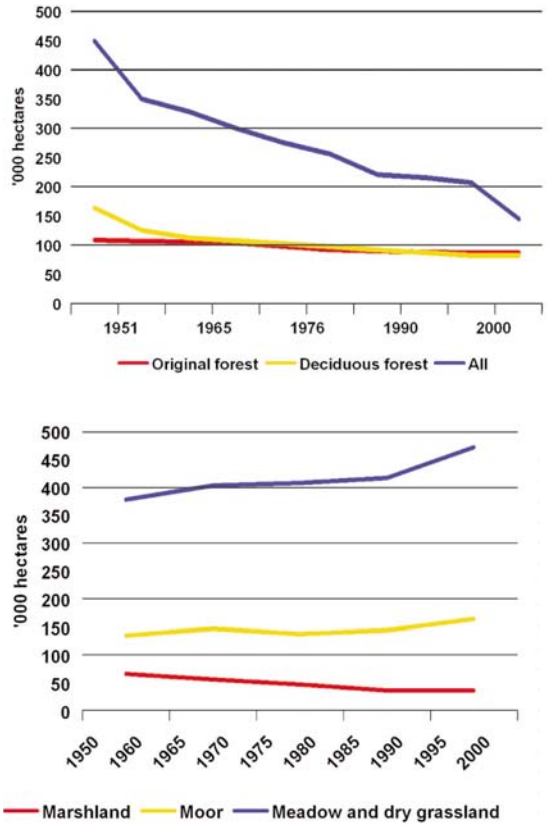
The figure shows that the number of classified substances and related substances has doubled since 1993. The number of completed classifications is subject to sudden increases, as larger numbers of classifications are completed at the same time. This work is still in progress.

Classification is an integral part of the overall work undertaken to assess and regulate chemical substances. Common EU classification creates a basis for common risk management, including bans on the sale of substances and products which are carcinogenic, mutagenic, or hazardous to embryos.

Indicator N8:

Area of natural habitats (deciduous forest, original forest, meadow, dry grassland, moor, and marshland)

Source: Nature and Environment – Selected Indicators 2001



This indicator elucidates developments in relation to the objective of securing a high degree of biodiversity and protecting ecosystems. The uppermost figure shows developments from 1950 to 2000 as regards the area of original forest, deciduous forest, and total forest. The bottom figure shows the development during the period 1950 to 2000 for these natural habitats.

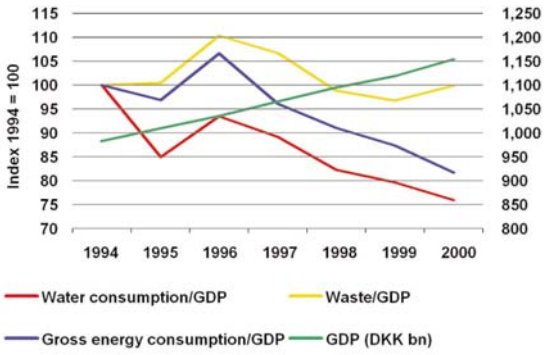
From 1950 to 2000, the total forest area has increased steadily, whereas the area of deciduous forest has changed relatively little. We also see that the area of original forest has fallen. The difference between the total area and the deciduous area mainly comprises imported conifers (particularly common spruce). The bottom figure shows that all three of the open natural habitats have dwindled in extent during the period 1950 to 2000. Indeed, the total area of the three natural habitats covered only half as much land in 2000 as it did in 1950.

One objective is to increase the extent of Danish woodland areas so that forests cover 20–25 per cent of Denmark. The forest area is being increased, and at the same time, the intention is to increase the area of deciduous forest as well as to retain the area of original forest. Thus, we see that the latest inventories show that the area of deciduous forest is once again on the rise. The intention is to increase the area accounted for by the open natural habitats meadow, dry grassland, and moor. This has not, however, yet had a discernible impact.

Indicator N9:

Resource flows for 3 factors (energy consumption, drinking water consumption, and total waste volume in relation to GDP)

Source: The National Environmental Research Institute, Denmark; and the Danish Energy Authority



This indicator elucidates developments in relation to the objective of using resources more efficiently. The figure shows the correlation between developments within selected consumption patterns, total waste volume, and economic growth.

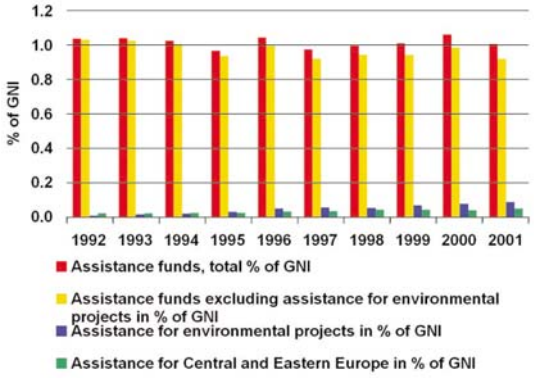
The waste volumes diminished during the period 1996 to 1999. This means that the waste intensity (waste production in relation to GDP) also fell during this period. Even so, the waste intensity rose again from 1999-2000 due to greater waste volumes. After a period of strong growth from 1995-96, both energy consumption and consumption of drinking water have fallen significantly up until 2000. At the same time, GDP grew steadily.

There has been a relative decoupling of energy consumption and drinking water consumption from economic growth during the period 1996 to 2000. The relative decoupling between waste volumes and economic growth is primarily the result of a reduction in waste volumes from power plants and the building and construction sector. If these two sectors are not included in calculations, we see that waste volumes grew from 1997-98 onwards.

Indicator N10:

Assistance funds as a percentage of GNI, in total and analysed between development and environmental assistance, and assistance to neighbouring countries

Source: The Ministry for Foreign Affairs and the Environmental Protection Agency



This indicator elucidates Denmark's international efforts. Denmark's international efforts within the assistance area have been calculated in accordance with the calculation rules used by the OECD development committee, the DAC. In addition to this, the figure shows the relative funds spent on environmental assistance (as a percentage of GNI) and other development assistance (total assistance excluding environmental assistance) as a percentage of GNI. Environmental assistance can be funded through official development assistance and the MIFRESTA framework.

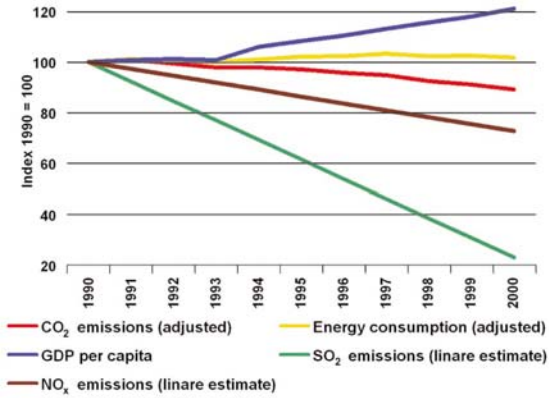
During the period 1992 to 2001, Denmark contributed approximately 1 per cent of its GNI every year, which is far more than the UN target of 0.7 per cent of GNI. In 2001, environmental assistance accounted for approximately 0.09 per cent of GNI, and this figure has increased during the years 1999–2001.

With its extensive international efforts, Denmark lives up to the objective to contribute to combating poverty in the world. The Danish objectives for promoting global, sustainable development are closely linked to the international development targets set by the UN, and they support these targets.

Indicator N11:

Environmental profile of the energy sector, illustrated by energy consumption and emissions of NO_x, CO_2 and SO_2 in relation to GDP

Source: The National Environmental Research Institute, Denmark



This indicator elucidates developments in relation to the objective of taking into account environmental considerations in all sectors. This indictor presents a picture of the emissions of greenhouse gases and acidifying substances from the energy sector. The energy sector almost exclusively emits the greenhouse gas CO_2, and this accounts for more than 45 per cent of Denmark's total emissions of greenhouse gases. In total, energy consumption accounts for almost 80 per cent of Denmark's emissions of greenhouse gases. This sector is also behind the most significant discharges of acidifying substances, e.g. SO_2.

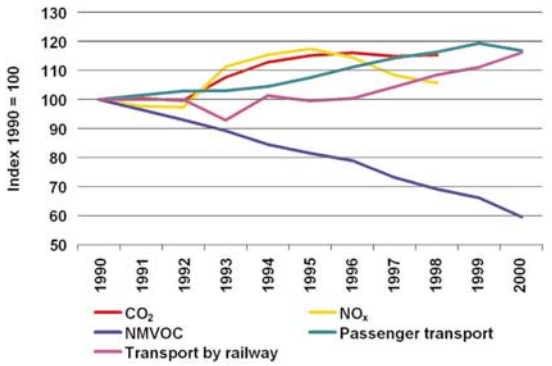
Since 1990, the corrected gross energy consumption has grown only marginally. Economic growth has not caused a corresponding increase in energy consumption. This is due to a significant drop in energy intensity (defined as the gross energy consumption per million GDP). The corrected CO_2 emissions arising from energy use in 1998 have been established at 56.4 million tonnes, whereas the corresponding figure in 1997 was 57.8 million tonnes. This corresponds to a reduction of 2.4 per cent. The period 1999 to 2000 saw a further reduction of 2.1 per cent. In relation to 1988, the reduction was 11 per cent. During the period 1990–2000, CO_2 emissions from the energy sector fell by more than 70 per cent, and in 2000, emissions of NO_X from the energy sector were 40 per cent lower than in 1990. Among other things, the reduction in CO_2 emissions during the 1990s was brought about by greater use of natural gas and renewable energy. More efficient use of combined heat and power has also reduced CO_2 emissions.

Danish emissions of all greenhouse gases (including CO_2) must be reduced so that the average level of emissions in the years 2008-2012 is 21 per cent lower than the annual emissions in 1990. Total energy consumption has increased by 8 per cent since 1988, while emissions have increased by almost 3 per cent. The energy produced is used in a more efficient manner. SO_2 emissions have been decoupled from economic growth, particularly due to flue gas decontamination and less sulphurous fuels. The target for reducing SO_2 emissions was reached in 1998.

Indicator N12:

Environmental profile of the transport sector, as illustrated by energy consumption, emissions of NO_x, CO_2 and NMVOC in relation to freight and passenger transport performance

Source: The National Environmental Research Institute, Denmark



This indicator elucidates developments in relation to the objective of taking into account environmental considerations in all sectors. The pollutants from traffic are mainly nitrogen oxides (NO_X), hydrocarbons (NMVOC), sulphur dioxide (SO_2), and particles and carbon monoxide (CO). In Danish towns, traffic is the main source of air pollution. CO_2 emissions are primarily linked to the climate issue.

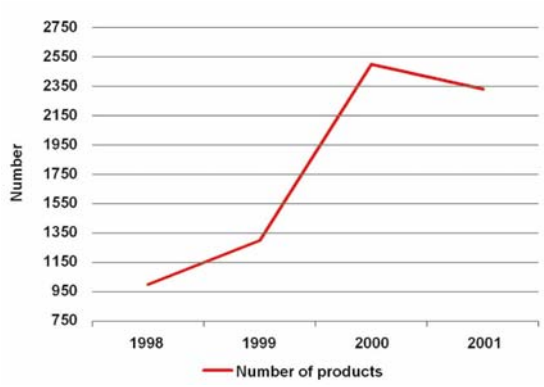
During the period 1990 to 2000, total passenger transport work (number of passenger km per year) rose by 17 per cent. Passenger transport by passenger cars account for more than 70 per cent. Freight transport work (tonnes km) grew by 16 per cent during the period 1990 to 1999. The total growth was primarily caused by increases in motorised road transport. The transport sector accounts for approximately 16 per cent of Denmark's total emissions of greenhouse gases (CO_2), which increased by 18 per cent during the decade 1990 to 2000. Despite mounting traffic, emissions of NO_X and NMVOC have fallen. This is due to the 1990 requirement stipulating that new petrol-powered cars must have catalytic converters. During the period 1988 to 1998, the number of cars with catalytic converters grew from zero to more than half of the total stock of cars.

For all other emissions, the link between economic growth and the environmental impact of transport has been successfully decoupled. It is likely that emissions of NO_X and NMVOC will continue to fall until all petrol-powered cars have a catalytic converter. New and stricter requirements on various types of vehicles will enter into force in 2005. Transport emissions of CO_2 have, however, followed the growth of freight and passenger transport performance.

Indicator N13:

Number of eco-labelled products, analysed as the number of trade names

Source: Eco-labelling Denmark



This indicator elucidates developments in relation to the objective about how the market must support sustainable development. The figures comprise the number of Swan-labelled and Flower-labelled products. In relation to indicator 11.1, the figures show that a licence may involve several trade names, which are sold to different retailers. This is particularly true within the printed matter industry. Until the summer of 2001, it also applied to the paper product area.

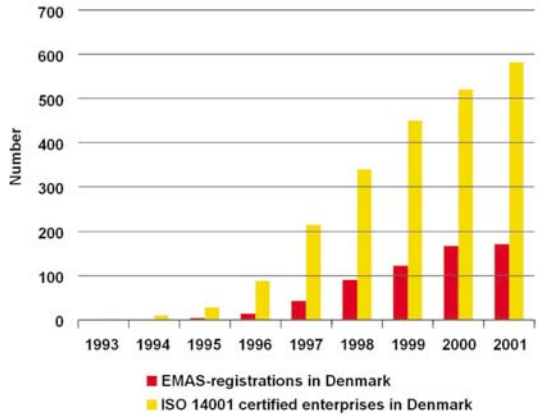
The number of widely available eco-labelled products has risen steadily. The most commonly seen eco-label is the Swan label, but the Flower is making good progress. In 1999, only two products bore the Flower, and in 2000 the corresponding number was seven. In 2001, however, the number of Flower-labelled products grew to 54. The increase coincides with the eco-label campaign launched in 2001. The number of products fell in 2001. The main reason was that the number of licences for printed matter fell because a number of paper manufacturers did not renew their licences.

The increase in the number of eco-labelled products available shows that there is a market for environmentally friendly products, and that the market can be used to support sustainable development.

Indicator N14:

Number of EMAS and ISO registered enterprises

Source: The Danish Environmental Protection Agency



This indicator elucidates developments in relation to the objective about how enterprises must increasingly be able to use their environmental efforts as a competitive parameter. The EMAS (Eco-Management and Audit Scheme) is the common European scheme for environmental management and environmental auditing. ISO 14001, which replaced BS 7750 in 1996, is the international standard for environmental management. The numbers in the figures are accumulated numbers which show the number of EMAS registered and ISO 14001 certified enterprises in Denmark. Many EMAS registered enterprises are also ISO 14001 certified.

Since 1994, the number of enterprises using environmental management has gone up every year. One reason why the increase in the number of EMAS registered enterprises from 2000 to 2001 is smaller than before is that the method of analysis has been changed in connection with the adoption of the new EMAS resolution in 2001.

The objective is to ensure that enterprises can increasingly use their environmental efforts to give them a competitive edge. Denmark is among the European countries which have the greatest number of EMAS registered enterprises compared to the size of the population (topped only by Austria). Developments in the number of EMAS and ISO registered enterprises show that it is possible to use environmental concerns as a competitive parameter.

4. Climate change

Objectives

In the strategy, the long-term objectives are that the atmospheric content of greenhouse gases must be stabilised at a level sufficiently low to prevent anthropogenic hazardous impacts on the climate. Unavoidable climate change must take place at a pace that allows ecosystems to adapt and ensures that food production is not threatened. At the same time, economic development must be maintained on a sustainable basis.

In an international context, Denmark has a high emission of CO_2 per capita, which gives us a special responsibility. Via the agreement to reduce emissions of six greenhouse gases by 21 per cent between 1990 and 2008-12, Denmark will make a serious contribution to the Kyoto Protocol and thus to the prevention of global climate change. Because of the scale of the problem, there is a great need to further reduce emissions after 2012. The UN's Intergovernmental Panel on Climate Change has indicated that a stabilisation of climate-gas concentrations at levels which make it possible to avoid anthropogenic climate changes may require emissions to be reduced by 50-70 per cent.

It is politically acknowledged that decoupling of economic growth from emissions of for example greenhouse gases is one of the greatest challenges in relation to achieving sustainable development.

On the basis of the IPCC's recommendations, the objective in the EU is that the concentration of greenhouse gases in the atmosphere be stabilised at a level equal to just under double the concentrations before industrialisation. This implies a long-term target whereby, before the turn of the next century, discharges by industrial countries are to be reduced by 10-15 per cent of discharges today. Denmark, along with the other countries participating in the Climate Convention, is expected to undertake further, significant emission reduction commitments in the budget periods after 2012. An indicative aim of a halving of CO_2 emissions in Denmark within one generation could be the result of continued stricter reduction targets in coming budgetary periods

Developments — a summary

The atmosphere's content of CO_2 has increased steadily. This increase in CO_2 concentrations is mainly the result of incineration of fossil fuels. In all likelihood, this is part of the explanation why average temperatures are on the rise, in Denmark as well as globally. At the same time, trend analyses of pollen data in Denmark show that the pollen season has changed significantly since pollen counts began in 1977. The season starts and culminates earlier, and quantities of pollen have increased. The reason for the shift towards earlier pollen seasons is that the weather has been significantly warmer in recent years, particularly during spring. The greater quantities of pollen may be partly caused by the increase in temperatures during the period, as higher temperatures usually lead to better growth conditions. This development indicates that there is a correlation between atmospheric contents of CO_2 and impacts on the climate (expressed here as average temperature, pollen season, and pollen quantities).

When taking a global view, developments within CO_2 emissions are far from being stable, and are even further away from beginning to fall. A fall is required in order to stabilise atmospheric contents. Developments in Denmark show a reduction of 12 per cent since 1990 (adjusted for fluctuations in electricity sector).

In 2000, total emissions corresponded to 1990 levels after having peaked in 1996. CO_2 emissions in particular have dropped since 1996. Emissions of N_2O and PFCs have remained relatively constant. Emissions of CH_4 have gone up since 1990. The overall reduction is mainly caused by the reduced export of electricity and by the increased use of natural gas and renewable energy instead of oil. The same causes are the reason why Denmark's total net emissions (gross emissions less sequestration) of greenhouse gases, expressed as tonnes of CO_2 equivalents, was back at 1990 levels in 2000 after having peaked in 1996. CO_2 sequestration in Danish forests has increased since 1990. This is due to sequestration in new forests established since 1990, as CO_2 sequestration in forests from before 1990 has been constant.

The development indicates that the national initiatives to reduce impacts on the climate (use of natural gas and renewable energy instead of oil, afforestation, etc.) have successfully reduced emissions of greenhouse gases to the atmosphere, particularly after 1996. During this period, economic growth and emissions of e.g. greenhouse gases have been decoupled.

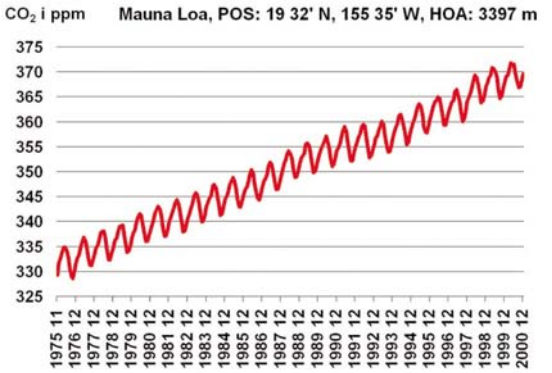
Perspectives for development of indicators

It is an important goal for Denmark to contribute its part to the Kyoto Protocol, thereby helping to counteract global climate change. It may be relevant to investigate the opportunities for developing an indicator for the extent of reductions in tonnes CO_2 equivalents outside of Denmark due to Danish assistance. Work should also be carried out to develop more indicators for the effects of climate change in Denmark.

Indicator 4.1:

The atmospheric concentration of CO_2

Source: The WMO World Data Centre for Greenhouse Gases



This indicator elucidates developments pertaining to the atmospheric content of greenhouse gases. The figure shows monthly average values for the atmospheric content of CO_2, measured on Hawaii. The unit used is ppm (parts per million).

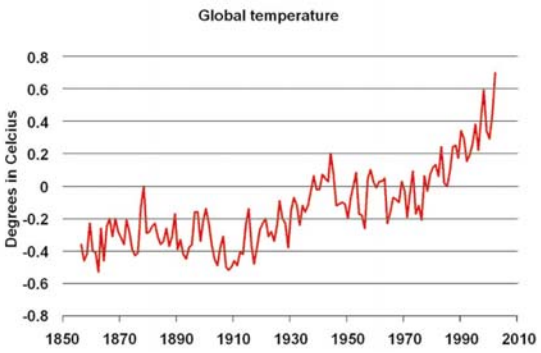
The seasonal variations in CO_2 content are caused by CO_2 being bound in plants in the northern hemisphere during summer, and by CO_2 being released when plants rot. The general increase in the concentration of CO_2 is greater than the annual fluctuations. The general increase in CO_2 concentrations is mainly the result of combustion of fossil fuels.

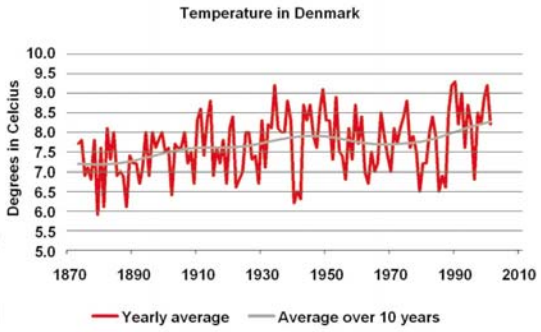
The figure illustrates how CO_2 emissions are still too large in relation to the sequestration of CO_2 in oceans and the biosphere. As a result, atmospheric content has increased. The 1992 UN Climate Convention, IPCC, demands that the atmospheric content of greenhouse gases must in the long term be stabilised at a level sufficiently low to prevent hazardous anthropogenic impacts on the climate. The IPCC indicates that this may require that emissions be reduced by 50 to 70 per cent. On this basis, the objective in the EU is that concentrations of greenhouse gases in the atmosphere be stabilised at a level equal to just under double the concentrations seen before industrialisation. This corresponds to a scenario where emissions from industrial countries are reduced by 10–15 per cent in relation to present-day emissions before the turn of this century. Implementation of the 1997 Kyoto Protocol will only lead to a reduction in emissions from industrialised countries of 5 per cent in 2008–12 compared to 1990 levels. This applies to six greenhouse gases (CO_2, CH_4, N_2O, CFCs, HFCs, and SF_6). Denmark's total reduction of 21 per cent corresponds to approximately 15 million tonnes of greenhouse gases, which accounts for more than 1.5 per cent of the total Kyoto reduction measured in tonnes.

Indicator 4.2:

Average temperature worldwide and in Denmark

Source: The Danish Meteorological Institute (DMI) and the Climate Research Unit (CRU), University of East Anglia





This indicator elucidates the speed and extent of climate change. The average temperature is measured near ground level.

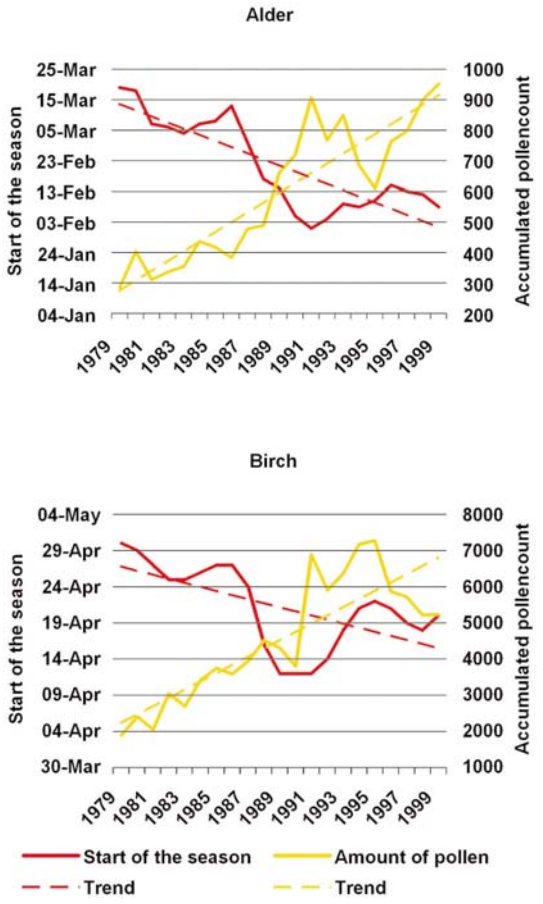
The long-term development in average temperatures near ground level globally and in Denmark are very much alike, but the increase is slightly higher in Denmark compared to global levels. In all likelihood, most of the increase seen after circa 1970 is caused by human impact on the climate. It can be difficult to distinguish between a general increase in temperatures caused by human influence and one occurring due to natural processes. A long period of temperature studies is required in order to unambiguously identify the anthropogenic impact on the climate. Despite the great variations in temperature measurements, the different types of measurements correspond well with each other.

The figures illustrate how the anthropogenic greenhouse effect is very likely to have affected long-term temperature developments. On top of human influences, we see variations caused by the chaotic nature of the climate or by natural impacts (volcanoes, solar variations, etc.).

Indicator 4.3:

Effects of climate change in Denmark indicated by the beginning and the size of the pollen season

Source: The Danish Meteorological Institute



This indicator illustrates the effects of climate change in Denmark, as indicated by the beginning of the pollen season. The figure shows that the pollen season has changed significantly since pollen counts began in 1977. The season starts earlier, and the quantities of pollen have increased. The greatest change in terms of the beginning of the season concerns early pollen from alder, from around 16 March to late January. The change for birch is somewhat more modest – from around 28 April to 16 April.

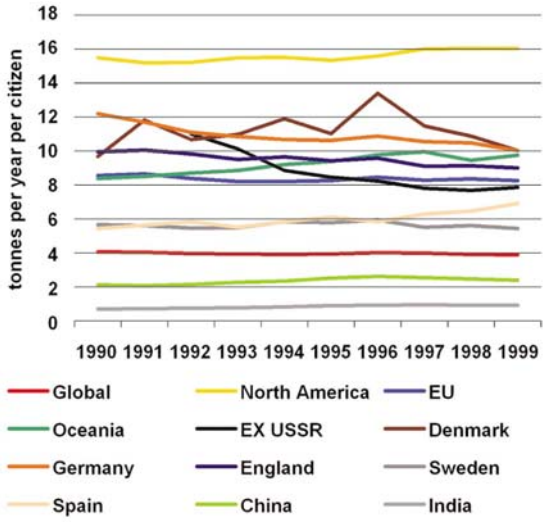
The reason for these shifts towards earlier pollen seasons is that the weather has been significantly warmer in recent years than when the pollen counts began, particularly during spring. The annual amount of pollen (the sum of the daily pollen counts) shows that the amounts have increased significantly – generally speaking with a factor of 2 to 3 during the period. The general increase can be one explanation of many for the observed increase in the number of people who are allergic to pollen.

The greater quantities of pollen may be partly caused by the increase in temperatures during the period, as higher temperatures usually lead to better growth conditions.

Indicator 4.4:

Global CO_2 emissions per capita, and in a number of regions and countries, including Denmark

Source: The International Energy Agency



This indictor shows what countries have special obligations due to their high emissions of CO_2. The figure shows developments in CO_2 emissions per capita for selected countries and regions, as analysed by the International Energy Agency.

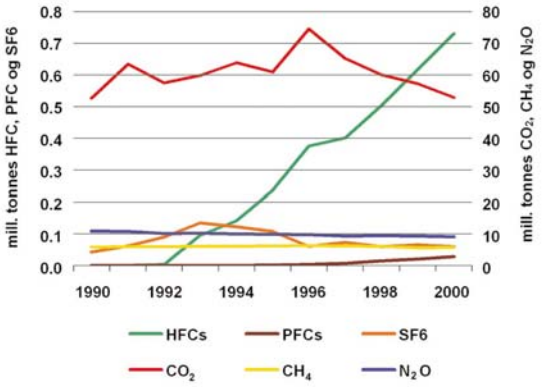
The development in Denmark is obscured by major fluctuations in the electricity sector. When corrected for these fluctuations, the net result is a 12 per cent reduction during the period (according to an analysis prepared by the Danish Energy Authority). The total emissions showed large increases in e.g. China (+25.6 per cent), India (+52.9 per cent), and the OECD (+10.3 per cent). For the industrialised countries, including Eastern Europe, we see a modest drop in total emissions of 1.4 per cent. For the EU as a whole, we see a drop of 3.7 per cent, which covers vast differences, e.g. a growth of 26.8 per cent in Spain and of 52.1 per cent in Portugal, while Germany saw a reduction of 17.8 per cent and the UK saw a fall of 9.5 per cent. For the world as a whole, we see a reduction of 4.2 per cent. This figure covers an increase in the total emissions of 8.9 per cent and a population increase of 13.7 per cent.

This development illustrates that CO_2 emissions, particularly within developing countries, are far from being stable, and are even further away from beginning to fall. A fall is required in order to stabilise atmospheric contents. There is a slight decrease in CO_2 emissions from industrialised countries. This decrease does, however, encompass vast national differences.

Indicator 4.5:

Total gross greenhouse gas emissions expressed in million tonnes CO_2 equivalents — and analysed between CO_2, N_2O, CH_4, HFC, PFC and SF_6

Source: The National Environmental Research Institute, Denmark



This indicator illustrates developments in relation to Denmark's contribution to the Kyoto Protocol. The indicator shows Denmark's emissions of greenhouse gases 1990–2000 in total and by each of the six green house gasses included in the scope of the Kyoto Protocol. Denmark's base year under the Kyoto Protocol comprises the 1990 emissions of CO_2, N_2O, and CH_4 as well as the 1995 emissions of HFCs, PFCs, and SF_6. This indicator does not extend to Greenland and the Faeroe Islands.

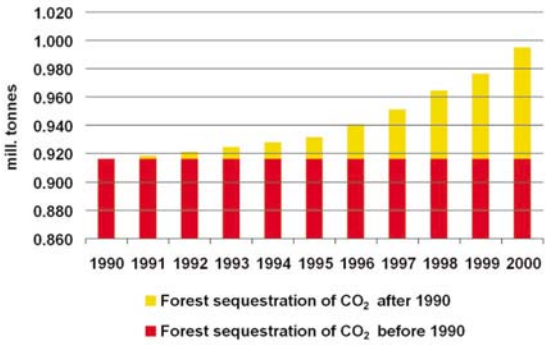
In 2000 the total emissions corresponded to 1990 levels after having peaked in 1996. The increase up until 1996 was partly due to the growing electricity production for export, which also peaked in 1996. The subsequent reduction has mainly been caused by the reduced export of electricity and by the increased use of natural gas and renewable energy instead of oil.

Developments in relation to Denmark's international goals for reducing emissions of greenhouse gases are described under Indicator 4.8.

Indicator 4.6:

CO_2 sequestration in million tonnes

Source: The National Environmental Research Institute, Denmark



This indicator illustrates the total sequestration of CO_2 in Danish forests during the period 1990 to 2000, as well as the relative distribution of such sequestration in forests pre-dating 1990, and in new forests established since 1990. Only the latter is included in analyses carried out under the Kyoto Protocol. The total CO_2 sequestration must be reported under the Climate Convention. This indicator does not extend to Greenland and the Faeroe Islands.

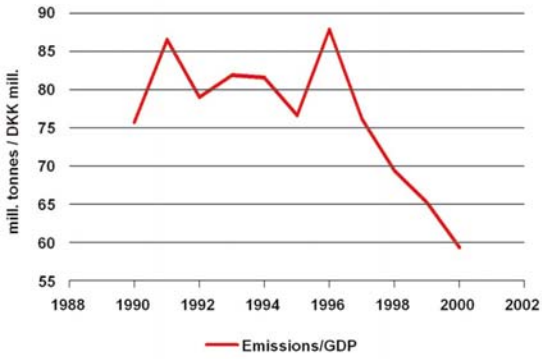
The sequestration in forests established before 1990 is deemed to be constant at approximately 0.9 million tonnes CO_2. In addition to this, sequestration due to new forest established since 1990 has grown to almost 0.1 million tonnes CO_2 during the period up until 2000.

Only the sequestration in new forests established since 1990 can be used as contributions towards honouring Denmark's reduction commitment under the Kyoto Protocol for the period 2008 to 2012. Developments in sequestration constitute part of the total development in relation to Denmark's international goals for reducing emissions of greenhouse gases, which are described under Indicator 4.8.

Indicator 4.7:

Total gross greenhouse gas emissions in million tonnes CO_2 equivalents in relation to GDP at constant prices

Source: The Danish Environmental Protection Agency



This indicator illustrates developments in relation to Denmark's contribution to the Kyoto Protocol. The indicator shows Denmark's emissions of greenhouse gases 1990–2000 in relation to developments in Denmark's gross national product (in 1995 prices). This indicator does not extend to Greenland and the Faeroe Islands.

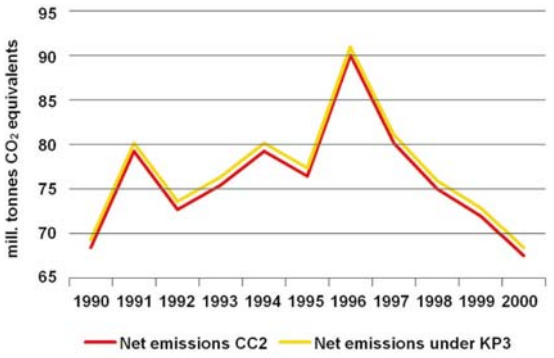
Following a series of increases and reductions up until 1996, the period since then has shown a reduction. Consequently, the 2000 level was 22 per cent below the level seen in 1990. As the emission level for 2000 corresponds to 1990 levels, this indicator shows that economic growth has been decoupled from the emission of greenhouse gases.

Developments in relation to Denmark's international goals for reducing emissions of greenhouse gases are described under Indicator 4.8.

Indicator 4.8:

Total net (gross less sequestration) greenhouse gas emissions in million tonnes CO_2 equivalents

Source: The National Environmental Research Institute, Denmark



This indicator illustrates developments in relation to Denmark's contribution to the Kyoto Protocol. Denmark's base year under the Kyoto Protocol comprises the 1990 emissions of CO_2, N_2O, and CH_4 as well as the 1995 emissions of HFCs, PFCs, and SF_6. The total emissions and sequestration must be reported under the Climate Convention. Under the Kyoto Protocol, the total emissions must be included in analyses, whereas only part of the CO_2 sequestration included. This indicator shows Denmark's net emissions of greenhouse gases 1990–2000 – i.e. emissions less sequestration – as it must be reported to the Climate Convention, including the total sequestration, and as it must be calculated under the Kyoto Protocol, i.e. including only sequestration in new forest established since 1990. This indicator does not extend to Greenland and the Faeroe Islands.

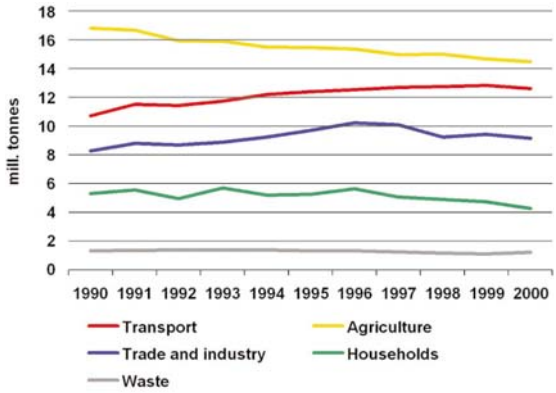
In 2000 the net emissions corresponded to 1990 levels after having peaked in 1996. The increase up until 1996 was partly due to the growing electricity production for export, which also peaked in 1996. The subsequent reduction has mainly been caused by the reduced export of electricity and by the increased use of natural gas and renewable energy instead of oil.

As the net emissions in 2000 corresponded to the net emissions in 1990, Denmark has met the Climate Convention objective which stipulates that the countries should trace back the emission level in 2000 to the level in 1990. When applying the methods of analysis used under the Kyoto Protocol, Denmark had achieved a reduction of almost 2 per cent in 2000 since the base year. As Denmark's objective under the Kyoto Protocol will be a reduction of 21 per cent up until the period 2008–2012, this leaves a reduction of approximately 19 per cent which still needs to be achieved compared to the emissions in 2000.

Indicator 4.9:

Gross emissions in million tonnes CO_2 equivalents analysed between industry, transport, households, agriculture, and waste

Source: The National Environmental Research Institute, Denmark



This indicator shows Denmark's emissions of greenhouse gases during the period 1990 to 2000, both in total and by sector. The distribution by sector corresponds to the one used in "Climate 2012", the Ministry of Energy and Environment, March 2001. Denmark's base year under the Kyoto Protocol comprises the 1990 emissions of CO_2, N_2O, and CH_4 as well the 1995 emissions of HFCs, PFCs, and SF_6. This indicator does not extend to Greenland and the Faeroe Islands.

In 2000 the total emissions corresponded to 1990 levels after having peaked in 1996. Emissions from the transport sector grew by almost 18 per cent. Emissions from agriculture fell by approximately 14 per cent, which is mainly due to the implementation of the Action Plans for the Aquatic Environment. These plans served to reduce nitrogen emissions, thereby also reducing nitrous oxide (laughing-gas) emissions. Emissions from the commercial sector have increased by almost 7 per cent, which is partly due to greater energy consumption, and partly due to the increasing use of HFCs as a cooling agent as an alternative to cooling agents which degrade the ozone layer. Emissions from households are down by approximately 19 per cent, which is mainly due to more efficient energy consumption and to the fact that consumers change from individual heating systems which use oil to systems which use natural gas, or to district heating. Emissions from the waste sector, which in this context extends only to methane emissions from landfills, are down by almost 9 per cent. This is mainly due to the 1997 ban on depositing degradable waste and to the increasing collection of methane from landfills for energy purposes.

The objective is to incorporate all reduction opportunities for greenhouse gases in the most cost-effective manner possible. As the figure shows, only the emissions from the transport sector and the commercial sector have not been reduced.

5. Biodiversity

Objectives

In the strategy, the overall goals for biodiversity, nature protection, and access to nature are that Denmark must remain a beautiful country with many lovely natural areas and a good environment. Sustainable development means that we must safeguard nature's potential. Therefore, it is important to have prioritised and targeted preservation of species, habitat types, ecosystems and genetic diversity. At the same time, we must increase areas with nature and forest and limit discharges of nutrients and compounds that are dangerous for the environment. Finally, biodiversity considerations must be integrated into the activities of the sectors involved.

Public awareness must be increased in order for people to understand that certain natural assets associated with natural and cultural landscapes, natural habitats and the diversity of species and gene pools are unique and irreplaceable. Denmark must utilise nature in a way that allows future generations access to natural resources to at least the same extent as today.

Outdoor recreation and nature experiences are important to people's well being and quality of life. It is important that there is general public support for a sustainable nature and environment policy. Therefore the public must have good access to nature, forests and the open countryside.

Developments — a summary

Only few species and natural habitats included in the scope of the EEC Habitats Directive have a favourable conservation status in Denmark. In 2000, the total area covered by the natural habitats marshland, moor, meadows and dry grassland extended only to approximately half the area seen in 1950. Since 1950, the area of original forest has also been approximately halved, but has remained stable since 1990. By contrast, the total area of forest has increased, with the main growth occurring since 1990. In 1997, a total of 3,142 species in Denmark were on the Red List. Of these species, 342 have disappeared, 1,608 are acutely endangered or vulnerable, and 1,192 are rare.

This development signifies that we know too little about species and natural habitats, and that natural habitats and nature types are strongly affected by nitrogen, the disappearance of wetlands, human interference, and the cessation of extensive farming.

The impacts of nutrients can be analysed in several ways. One example would be the transparency of lakes, which is an expression of the amount of light available to bottom flora. It depends on the quantities of plant plankton, which in turn means that it depends on the level of nutrients in the upper waters. Generally speaking, transparency has improved during the period 1989 to 2000, and the most opaque lakes have become clearer. The minimum requirement as regards transparency has been met in approximately 30 per cent of the monitored lakes. The reasons for non-compliance with the minimum requirement are still too high discharges and build-up of nutrients. The high contributions of nutrients also mean that the critical loads for eutrophication are transgressed for many Danish natural habitats.

During the 1990s, however, there has been a significant reduction in phosphorus discharges and a smaller reduction in nitrogen discharges into the sea. The reduction in phosphorus discharges is caused by improvements to wastewater remediation. For nitrogen, the impacts from wastewater have also been significantly reduced, as have impacts arising from arable land, which account for by far the greater share of nitrogen.

Many initiatives have been launched to strengthen efforts to preserve and recreate habitats for indigenous fauna and flora. One example would be afforestation. The goal is to increase Danish woodland areas so that forests will cover 20–25 per cent of Denmark. From 1950 to 2000, total forest area has increased steadily, whereas the area of deciduous forest has changed relatively little. This is to say that the increase in the forest area has mainly been carried out with imported conifers. The objective is to increase the area of deciduous forest, and the latest surveys show that developments are headed in the right direction. Afforestation also helps protect vulnerable groundwater resources used for drinking water and provides the population with better opportunities for outdoor recreation.

Perspectives for development of indicators

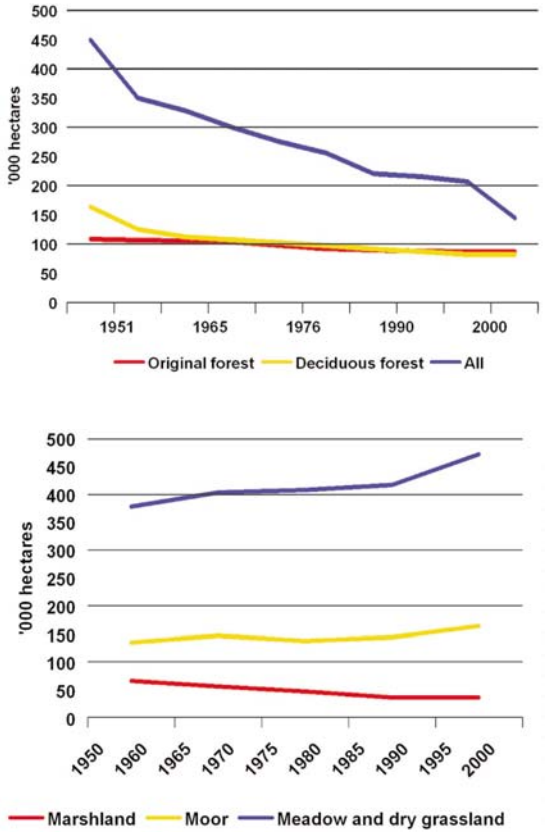
It would be relevant to assess the opportunities for developing an index as a more comprehensive indicator for biodiversity. It may be relevant to consider the opportunities for developing further indicators in connection with the goal of protecting and restoring habitats for indigenous animals and plants in order to have large viable populations on land and in freshwater and marine environments. Moreover, it may be relevant in the long term to develop indicators which elucidate developments in the quality of nature within standard landscapes and areas with high nature contents, and to include the percentage of unaffected watercourse systems and lakes (overloads in relation to natural nutrient levels) in existing indicators. Finally, it should be considered whether the extent of wet meadows, hedgerows (measured in km), the average size of fields, and the extent of pesticide-free areas can be used as indicators.

An action plan for protection of biodiversity in Denmark must seek to render the current efforts more target-specific. In this connection, work must be carried out to develop an indicator which can elucidate interconnectedness of habitats and the opportunities for spreading of species, as well as integration of concern for biodiversity within the relevant sectors.

Indicator 5.1:

Area of natural habitats (deciduous forest, original forest, meadow, dry grassland, moor, and marshland)

Source: Nature and Environment – Selected Indicators, 2001



This indicator illustrates developments in relation to strengthening efforts for biodiversity and nature protection and rendering these efforts more target-specific. The uppermost figure shows developments from 1950 to 2000 as regards the area of original forest, deciduous forest, and total forest. The bottom figure shows the development during the period 1950 to 2000 for the natural habitats mentioned.

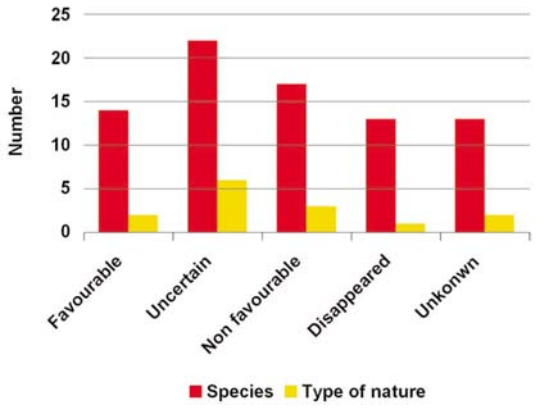
From 1950 to 2000, total forest area has increased steadily, whereas the area of deciduous forest has changed relatively little. We also see that the area of original forest has fallen throughout the entire period from 1950 to 1990. The difference between the total area and the area of deciduous forest is primarily imported conifers, particularly common spruce. The bottom figure shows that all three of the open natural habitats have dwindled in extent during the period 1950 to 2000. Indeed, the total area of the three natural habitat types covered only half as much land in 2000 as it did in 1950.

The goal is to increase the extent of Danish woodland areas so that forests will cover 20–25 per cent of Denmark. As illustrated above, this development is ongoing. At the same time, the objective is to increase the area of deciduous forest and to retain the area of original forest. The latest inventories show that the area of deciduous forest is once again on the rise. The intention is also to increase the area accounted for by the open habitats meadow, dry grassland, and moor. This has not, however, yet had a discernible impact in the latest inventories.

Indicator 5.2:

Conservation status for species and natural habitats in Natura 2000 sites, registered in 2000

Source: Natur og Miljø, 2001



This indicator elucidates the conservation status for species and natural habitats which fall within the scope of the EC Habitats Directive. The Habitats Directive covers 61 natural habitats believed to exist in Denmark. Of these, a total of 13 habitat types have a special priority status in the Directive. In addition to this, the overview is based on 79 species that also fall within the scope of the Habitats Directive and which have proven to be good indicators for the conservation status of Danish species.

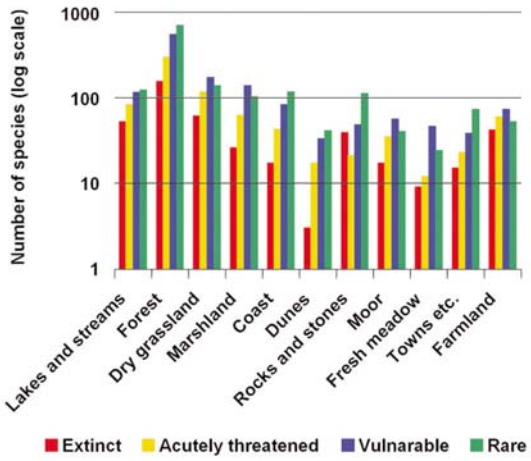
The figure shows that only few habitats and species can be said to enjoy a favourable conservation status. This is a sign that we know too little about species and habitats, and that habitats and nature types are strongly affected by nitrogen, the disappearance of wetlands, and human interference. No conclusions on factual developments can be drawn, as this figure is the first status report. The status will be monitored regularly in connection with reporting under the Habitats Directive.

In 2003, the Government will prepare an action plan for protection of biodiversity with a view to having Denmark meet the requirements and expectations outlined in the UN Biodiversity Convention and EU requirements with regard to nature. This is to be done by e.g. safeguarding existing natural areas of high quality and by developing a network of protected natural areas (the NATURA 2000 network in accordance with the EC Habitats Directive).

Indicator 5.3:

Species in Denmark which are on the Red List

Source: Red List 1997, Stoltze and Pihl



This indicator illustrates developments in relation to the objective of intensifying efforts to protect and restore habitats for indigenous animals and plants. The figure shows the extent of plant and animal species on the red list in relation to the Danish habitat types. The inventory of endangered plants and animals in Denmark, the Red List 1997, comprises 3,142 species. Of these species, 342 have disappeared, 1,608 are acutely endangered or vulnerable, and 1,192 are rare. An increase in the number of species on the Red List is a sign that living conditions are deteriorating for the species in question, e.g. as a result of structural developments within agriculture.

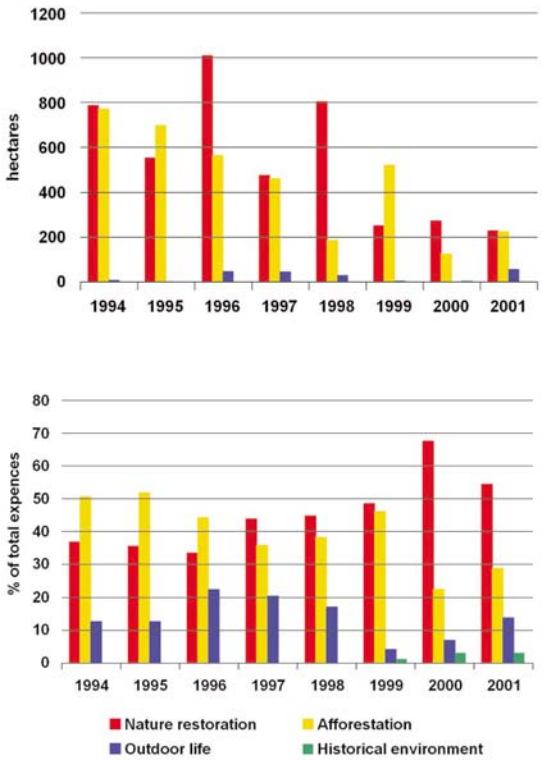
Half of all species on the Red List inhabit or have inhabited forests, which is a natural consequence of the fact that Denmark was originally a forest country. Dry grasslands feature the largest number of species per area unit. The changes in the cultivation of dry grasslands, which for hundreds of years have been used for continual grazing with no use of fertilisers, have brought about considerable negative impacts for the plants and animals which have adapted to dry grasslands and use them as habitats.

Registration of the extent of plant and animal species on the Red List in relation to Danish habitat types can contribute to more target-specific efforts to protect and restore habitats for indigenous animals and plants in order to have large viable populations on land and in freshwater and marine environments.

Indicator 5.4:

Areas acquired by the State for nature management

Source: The Danish Forest and Nature Agency



This indicator elucidates efforts to preserve and restore habitats for indigenous animals and plants. The figures provide an overview of the annual efforts made with funding from State nature-management funds. The uppermost diagram shows the extent of the areas acquired by the State for nature management, measured in hectares. The area acquired per year, measured in hectares, is an indicator of the physical efforts made and their relative distribution within the areas nature restoration, afforestation, outdoor recreation, and historical environments. Note that the extent of the areas is less relevant to projects involving outdoor recreation and historical environments, which are carried out in areas that have been acquired for afforestation and nature restoration or in other areas managed by the Danish Forest and Nature Agency. The bottom diagram illustrates the prioritisation of the action areas found within State nature management divided into nature restoration, afforestation, outdoor recreation, and historical environments measured in per cent of the total funds allocated for nature management.

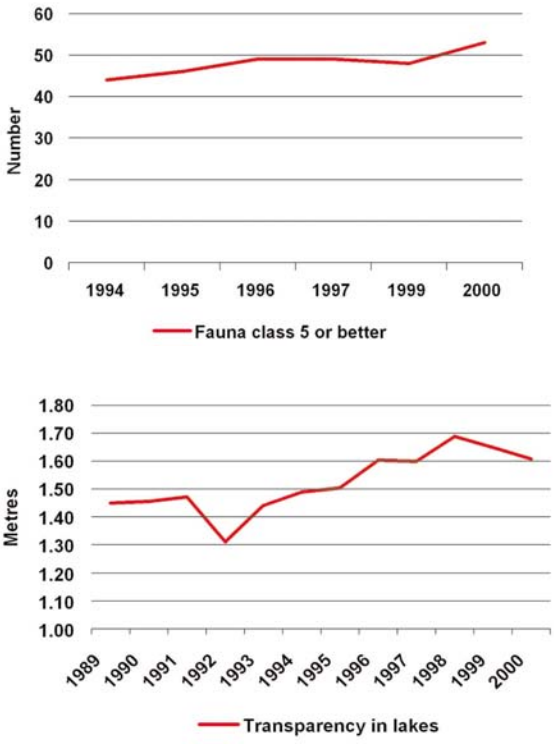
Up until 1998, the aim was to spend 40 per cent of these funds on nature restoration, 40 per cent on afforestation, and 20 per cent on outdoor recreation. After 1998, the aim is to distribute the funds as follows: 40 per cent on nature restoration, 30 per cent on afforestation, 20 per cent on outdoor recreation, and 10 per cent on historical environments. Deviations can be made from this distribution in connection with relevant projects and changes in the annual allocations of funds. From 1999, a significant part of the annual funds have been earmarked for the Skjern River Project, which means that nature restoration accounts for a high percentage of the total annual expenditure from 1999 onwards. The level of acquisitions of areas for nature restoration and afforestation has fallen since 1998. This is partly due to the fact that a significant number of the annual nature-management funds have been earmarked for the Skjern River Project during the period 1999 to 2001.

The nature restoration projects help fulfil international obligations, e.g. in connection with the EC Bird Protection Directive, the EC Habitats Directive, and the Biodiversity Convention. Afforestation supports national political goals and helps to protect vulnerable groundwater resources used for drinking water. The efforts made provide the public with better opportunities for outdoor recreation and communicate the historical dimension of the Danish landscape.

Indicator 5.5:

Danish watercourse fauna index (water quality in watercourses) and transparency (water quality in lakes)

Source: The National Environmental Research Institute, Denmark



This indicator elucidates efforts to preserve and restore habitats for indigenous animals and plants. The uppermost figure shows the development in the number of watercourse stations with a biological watercourse quality corresponding to fauna class 5 or better in accordance with the Danish watercourse fauna index (the DVFI system). Class 5 is normally regarded as sufficient to meet the fishing waters target (salmon fishing waters) for watercourses. The bottom curve illustrates the development in transparency in monitored lakes during the period 1989 to 2000. Transparency is an expression of the amount of light available to bottom flora. It depends on the quantities of plant plankton, which in turn means that it depends on the level of nutrients in the upper waters.

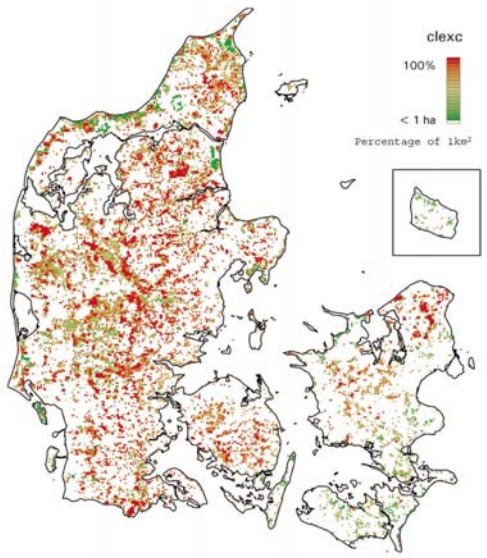
Generally speaking, transparency has improved during the period 1989 to 2000, and the most opaque lakes have become clearer when considered on an annual basis. For watercourses, the percentage of stations with an acceptable watercourse quality has grown significantly from 37 per cent in 1994 to 45 per cent in 2000.

The target for a given lake is only deemed to have been met if e.g. a set minimum requirement on transparency is met. Approximately 30 per cent of all targets have complied with the targets during the period illustrated. The reason for non-compliance with the minimum requirement is still excessive discharges and build-up of nutrients. The reasons behind unsatisfactory biological watercourse quality often involve poor physical conditions due to severe maintenance and regulation, and in some cases reduced water volumes due to water catchment. In addition to this, wastewater discharges from individual properties and localise ochre pollution may also be part of the reasons why the target has not yet been met.

Indicator 5.6:

Transgression of critical loads for ammonia and nitrogen oxides (for moors, upland moors, dry grassland, etc.)

Source: Natur og Miljø 2001 Påvirkninger og tilstand



This indicator illustrates developments in relation to the objective of intensifying efforts to protect and restore habitats for indigenous animals and plants. The figure shows the relative proportion of natural areas in Denmark where the critical loads for acidification and/or eutrophication have been transgressed for moors (42 per cent), dry grasslands (57 per cent), dune heaths (7 per cent), water meadows (11 per cent), lobelia lakes (100 per cent), upland moors (100 per cent), deciduous forests (63 per cent), and coniferous forests (94 per cent). Acidification is caused by air pollution, e.g. SO_2 emissions. Eutrophication is caused by nutrient enrichment of freshwater environments in the form of nitrogen and phosphorus. The proportionate areas have been analysed by means of a 1 x 1 km grid. White cells mean that the area in which transgressions can be found is smaller than one hectare.

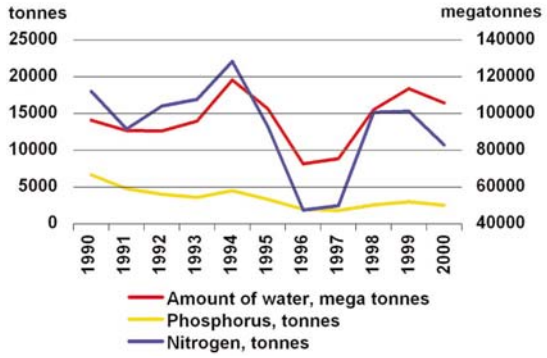
In the case of dry grasslands, moors, dune heaths, lobelia lakes, and upland moors, the transgressions are attributable to eutrophication, i.e. to impacts from nitrogen oxides and ammonia. Almost half of the forests feature transgressions for acidification as well as eutrophication, more than half of them suffer exclusively from eutrophication, and a few per cent suffer exclusively from acidification. A small percentage of the Danish water meadows also suffer from transgressions due to acidification.

Generally speaking, it is estimated that the transgressions of the critical loads will be mitigated as the result of agreements already entered into on reductions of air pollution. There are, however, areas in Denmark where dense livestock populations cause the background load to be so high that sensitive natural areas remain unprotected.

Indicator 5.7:

Nitrogen and phosphorus discharges into the sea in tonnes per year

Source: The National Environmental Research Institute, Denmark



This indicator illustrates developments in relation to the objective of intensifying efforts to protect and restore habitats for indigenous animals and plants. The curves show the total annual quantities of freshwater, nitrogen, and phosphorus discharged via watercourses and point sources from Denmark and into the sea. The data shown cover the period 1990 to 2000. The average annual discharges are approximately 93,000 tonnes of nitrogen and approximately 3,500 tonnes of phosphorus per year. There is a definite correlation between water runoffs and substance runoffs when considering individual years. This correlation is particularly apparent for nitrogen runoffs.

During the 1990s there has been a significant reduction in phosphorus discharges and a smaller reduction in nitrogen discharges into the sea. Analyses of the trends regarding nitrogen runoffs have been carried out on the basis of data which have been corrected for variations in water runoffs. The reduction in phosphorus discharges is caused by improvements within wastewater remediation. For nitrogen, the impacts from wastewater have also been significantly reduced, as have impacts arising from arable land, which account for by far the greater share of all nitrogen.

The general target is a halving of nutrient contributions from watercourses and point sources into the sea compared to 1980s levels. For phosphorus, this target was reached in 1996-97 due to improved wastewater remediation. For nitrogen, the target has not yet been reached, as the reductions seen so far account only for approximately 30 per cent. More initiatives have been launched in recent years to reduce contributions from agriculture, and so it is expected that the target for nitrogen will also be met in the long term.

6. Environment and health

Chemicals, environmental pollution, food, physical working environment and physical indoor conditions

Objectives

In the strategy, the goal is that Denmark should be a country where pollution from products, food, working environment, traffic and physical indoor conditions affecting the population's quality of life and health is constantly falling. Harm to animals and plants from pollution should also be limited. The level of protection must take account of especially sensitive groups of people – such as children, pregnant women, people who suffer from allergies or from chronic illness – and of particularly vulnerable ecosystems.

By 2020, no products on the market may contain chemicals with particularly problematic effects on health and the environment.

Contaminated soil must not threaten drinking water or human health. By 2020, there must be no emissions to air, soil, or water which are harmful to human health or the environment. By 2020, pathogenic micro-organisms must be reduced to a level that does not pose a threat to human health.

Consumers must have access to food which is safe and healthy and of high quality. Food safety must be absolute and the presence of chemical pollutants must be minimised.

In 2020, no one will be exposed to harmful impacts from chemical substances at work, especially carcinogenic compounds, organic solvents, and heavy metals.

Developments — a summary

During the period 1987 to 2000, the incidence of adults with self-reported asthma and non-seasonal allergic colds has almost doubled. There has been a similar development in the incidence of hay fever, which is to say that in 2000, 12.5 per cent of all adults had reported a case of hay fever within the last year. The same period also saw an increase in the incidence of self-reported allergic eczema, which 8.2 per cent of all adults had in 2000. From 1994 to 2000, the percentage of children with asthma or asthmatic bronchitis reported by their parents rose, but this increase was not significant. In 2000, asthma and asthmatic bronchitis affected approximately 7.6 per cent of all children. These complaints entail varying degrees of limitations in everyday lives and reduce the patient's quality of life. In addition to the hereditary aspect, environmental factors and lifestyle issues are regarded as important causes behind these ailments.

For chemicals, the number of common EU classifications of substances and substance groups has doubled since 1993. The substances and substance groups classified at the end of 2001 comprise 7,000 substances of the total of 100,000 substances available on the European market, either now or in the past. Common EU classification creates a basis for common risk management, including bans on the sale of substances and products which are carcinogenic, mutagenic, or hazardous to embryos, and for regulations and bans in relation to sales of substances and products which are carcinogenic.

The annual sales of pesticides which are suspected of being carcinogenic have varied since 1994. This is due to variations in the products used in the agricultural sector. From 1998-2000, there has been a pronounced drop in sales of pesticide active substances from approximately 500,000 kg to less than 50,000. This is primarily due to the phase-out of the substance isoproturone, which was used as an herbicide. This means that the level of protection has increased considerably when assessing the impact on health and the environment of plant protection products and biocides.

As regards environmental quality and other environmental factors, many threats against health and the environment have been reduced. Emissions of acidifying substances have been reduced, as have emissions of ozone-depleting substances. A total of approximately 1000 remediations of contaminated soil are carried out each year. These remediation efforts are funded by a range of schemes. The activities aimed against the spreading of pathogenic micro-organisms have been successful, which means that bathing bans are now down to 33 per cent of 1990 levels.

Emissions of the acidifying substances SO_2 and NO_X have dropped since 1980. SO_2 emissions mainly come from combustion of fossil fuels, and the reduced emissions are the result of a switch to cleaner and more renewable energy sources. The drop in total NO_X emissions is partly due to the use of catalytic converters on cars and cleaning plants at power plants. Emissions of NH_3, which contributes to eutrophication in Denmark, have also dropped. This is due to reduced leaching from agriculture.

Emissions of ozone-depleting compounds, particularly the so-called CFCs, have degraded the atmosphere's ozone layer. The ozone layer over Denmark has been depleted by approximately 0.4 per cent per year on average throughout the last 20 years. Since 1979, consumption of ozone-depleting compounds has fallen considerably – by approximately 60–80 per cent when calculated in terms of the ozone-depleting effect. It will be several years before there are discernible signs of the ozone layer being restored, and the ozone layer will possibly not be fully restored until the middle of this century.

The need for remediation of soil contamination has been calculated from 1998 onwards. There is an estimated need for remediation of 14,000 sites. The number of remediations per year has remained relatively stable throughout the period, with a slight drop in 2000. The purpose of these remediations is to ensure that soil contamination in residential areas and contamination which may threaten present or future water supply does not cause any health problems.

The number of bans against bathing is an indicator for the efforts aimed against dispersion of pathogenic micro-organisms. The number of bans against bathing has fallen steadily since the beginning of the 1990s, to a point were the level of bans corresponds to just 33 per cent of 1990 levels. This reflects a general improvement in water quality, and is a sign that the municipal efforts to eliminate the causes of pollution have worked.

As regards food safety, the contents of lead and mercury in food have diminished during the last 15 years. The contents of PCBs in fish have also fallen considerably since 1988. The variations in the frequency of samples where chemical pollution has been found in food do not, however, show any significant increases or reductions during the period 1990 to 2000.

The Danish Veterinary and Food Administration takes samples of food in order to examine their content of chemical pollutants. During the period 1990 to 2000, positive results were yielded from between 0.01 per cent and 0.05 per cent of the samples taken. The variations in frequency show no significant increase or reduction.

The trend regarding PCB contents in cod liver from Danish waters is an indicator of PCB contents in fish in general. Restrictions on the use of PCBs were introduced in Europe in the 1980s, and this has brought about a significant reduction in marine pollution. As regards Denmark, the drop in PCB concentrations in cod liver is most clearly apparent in the Baltic and in Danish waters.

Contents in food of the hazardous heavy metals lead, cadmium, mercury, and nickel and consumption hereof have been monitored since 1984. The monitoring process has involved all food categories. Lead and mercury exhibit a downward trend over 15 years, which corresponds to the environmental efforts made against emissions of these two substances during the same period. Despite the fact that intense environmental work against cadmium was carried out during the same period, consumption of cadmium

fell only slightly. This also applies to nickel. The reason for this may be that cadmium and nickel both appear naturally in soil in considerable quantities.

The number of injuries caused by organic solvents and reported to the National Working Environment Authority has fallen constantly from approximately 475 reports in 1993 to approximately 150 reports in 1999. During the period 1993 to 1999, there were approximately 50 reports each year of brain damage due to heavy metals, and no significant changes are discernible.

At present, carcinogenic compounds are used commercially in quantities greater than 100 tonnes per year. In 1999, the total calculated consumption of such compounds was approximately 17,000 tonnes. Substitution and changed working processes should be used to significantly reduce this consumption. As the year 2000 must be regarded as the base year for monitoring of the use of carcinogenic compounds, it is not yet possible to establish any trends.

Perspectives for development of indicators

An interdisciplinary group will be established with a view to elucidating the opportunities for developing a wider set of indicators. The aim is for the proposed indicator for asthma and allergies to be developed as the data basis comes to comprise significantly wider records. In addition to this, the WHO's development of indicators for health and the environment will be carefully monitored with a view to using relevant new indicators to elucidate the objectives.

There will be a need to carry out further development of an indicator in order to include all chemicals on the market. Similarly, it would be relevant to investigate the opportunities for developing an indicator for the number of biocides which give cause for concern, have been phased out, or which have been denied access to the Danish market as a result of the approval scheme. The objective would be to elucidate the level of protection when assessing the impact on health and the environment of plant protection products and biocides.

More and better indicators will be developed on an ongoing basis. For example, there will be a need for an indicator for the atmosphere's content of fine particles (PM2.5).

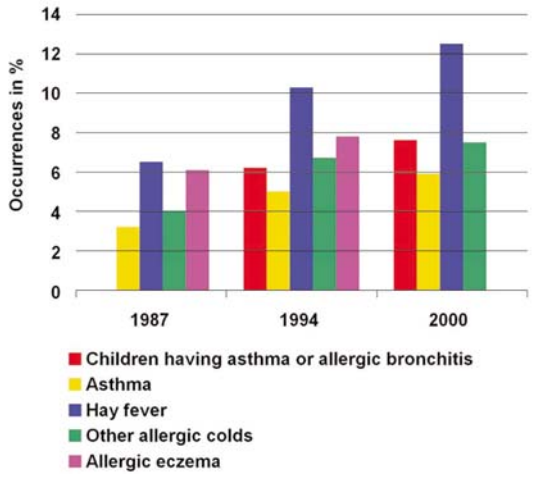
In addition to this, work will be carried out to assess opportunities for developing an indicator which can elucidate discharges into the aquatic environment of heavy metals and xenobiotic substances that accumulate in the food chain.

Furthermore, work will be carried out to develop an indicator for incidences of illness caused by pathogenic micro-organisms in the environment. Work will be carried out to develop more and better indicators for the efforts regarding the working environment.

Indicator 6.1:

Incidences of asthmatic bronchitis and asthma, allergic coryza (hay fever and non-seasonal colds), and allergic eczema in 1987, 1994 and 2000

Source: DIKE 1997 and the National Institute of Public Health 2002



This indicator illustrates developments in relation to the objective of reducing harmful impacts on human health and on the environment to the greatest possible extent, no matter what the source. The indicator comprises the percentage of Danish children (aged 0 to 15 years) who had asthma or asthmatic bronchitis within the last twelve months in 1994 or 2000 (reported by their parents), and adults (aged 16 and above) who in 1987, 1994, or 2000 reported that they had suffered from asthma, hay fever, an allergic cold or allergic eczema within the last twelve months.

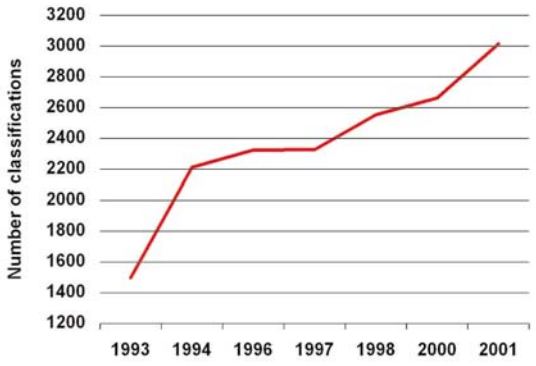
During the period 1987 to 2000, the percentage of adult Danes with self-reported non-seasonal asthma and allergic colds within the last twelve months almost doubled. During the same period, the number of adults reporting allergic eczema rose by 33 per cent. There has been a similar development in the incidence of hay fever, which is to say that in 2000, 12.5 per cent of all adults had reported a case of hay fever within the last twelve months. The same period also saw an increase in the incidence of self-reported allergic eczema, which 8.2 per cent of all adults had in 2000. From 1994 to 2000, the percentage of children with asthma or asthmatic bronchitis reported by their parents rose. This increase is, however, not statistically significant. From 1994 to 2000, the percentage of children with asthma or asthmatic bronchitis (reported by their parents) rose, but this increase was also not statistically significant. In 2000, asthma and asthmatic bronchitis affected approximately 7.6 per cent of all children.

In addition to the hereditary aspect, environmental factors and lifestyle issues are regarded as important causes behind these ailments. The Government is currently preparing a strategy for the correlations between environmental factors and health. Among other things, this will serve to make efforts aimed at limiting harmful impacts on human health more target-specific. Indicators for this area will be developed on an ongoing basis in connection with the Government's work and efforts within the asthma and allergy area.

Indicator 6.1.1.:

Number of chemicals classified

Source: The Danish Environmental Protection Agency



The figure illustrates developments in common EU classifications of substances and substance groups. Classification is an integral part of the overall work undertaken to assess and regulate chemical substances. Common EU classification creates a basis for common risk management, including bans on the sale of substances and products which are carcinogenic, mutagenic, or hazardous to embryos. The figure does not include substances which have been self-classified by manufacturers.

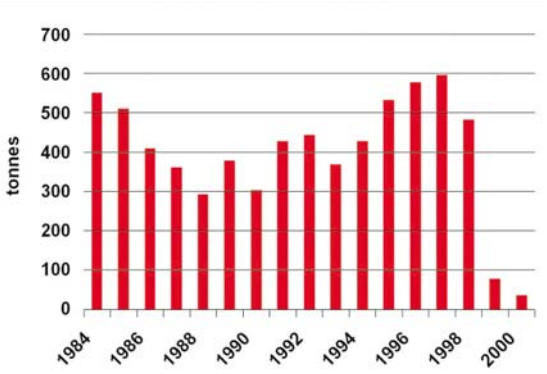
The figure shows that the number of classified substances and related substances has doubled since 1993. The substances and substance groups classified at the end of 2001 comprise 7,000 substances of the total of 100,000 substances available on the European market, either now or in the past. The number of completed classifications is subject to sudden increases, as a large number of classifications are completed at the same time. The work is still in progress.

The increased number of common EU classifications establishes a basis for common risk management and supports the objective of how the use of chemicals must be limited, and whenever relevant, any chemicals with harmful effects on human and animal health and on nature must be prohibited.

Indicator 6.1.2:

The volume of sales of pesticide active substances classified as being particularly hazardous

Source: The Danish Pesticide Statistics



This indicator is an inventory of the annual sales of pesticides (active substances) which are classified as being suspected of carcinogenic effects. The inventory comprises only substances which are used in agriculture. The indicator illustrates developments in the level of protection by assessing the impact on health and the environment of plant protection products and biocides.

The variation in the sales of pesticides suspected of being carcinogenic is caused by farmers switching between products. In some cases, hoarding is involved. The significant drop in sales from 1998 to 1999 was primarily due to the phase-out of the substance isoproturone, which was used as herbicide.

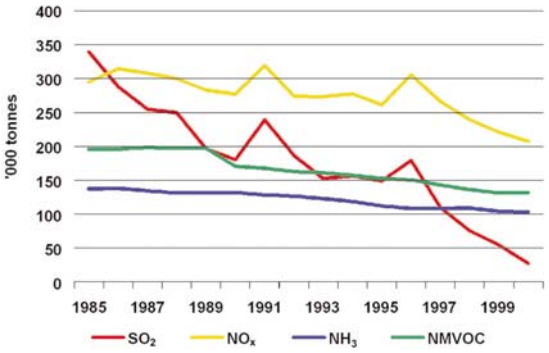
Pesticides which cause unacceptable effects from normal usage cannot be approved. This is to say that pesticides which are suspected of being carcinogenic can only be approved if their use does not entail unacceptable effects. A drop in the sales of pesticides suspected of being carcinogenic increases the level of protection. The considerable drop in sales also contributes to development in the right direction as regards the objective that by 2020, no products or goods on the market may contain chemicals which have highly problematic effects on health or the environment.

6.2. Environmental quality and other environmental factors

Indicator 6.2.1:

Emissions of SO_2, NO_X, VOC, and NH_3

Source: The National Environmental Research Institute, Denmark



SO_2, NO_X and NH_3 all contribute to acidification, and SO_2 and NO_X in particular are typically transferred over long distances. NH_3 and NO_X contribute to eutrophication in Denmark.
By far the greater part of all SO_2 emissions come from combustion of fossil fuels, mainly coal and oil. Approximately half of all Danish NO_X emissions come from road transport and other mobile sources. Power plants are another major source. In recent years, the total NO_X emissions have fallen. This is partly due to the use of catalytic converters on cars and remediation systems at power plants. Emissions of VOC can be divided into two main types: incomplete combustion and evaporation. Denmark has reduced its NMVOC emissions by approximately 30 per cent during the period 1985 to 1999. As regards NH_3 emissions, the agricultural sector accounts for approximately 98 per cent of total emissions.

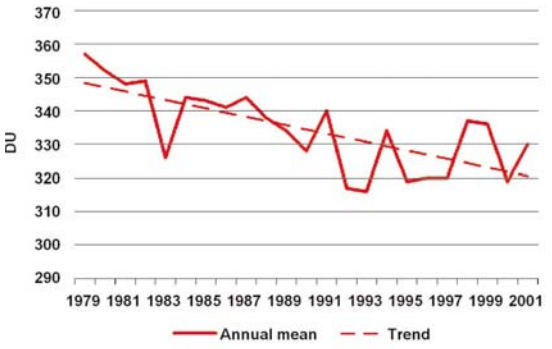
The figure elucidates the emissions of NMVOC caused by humans. Besides there are several other NMVOC sources, thus the total impact on the environment is larger than the impact illustrated in the figure.

Denmark expects to be able to fulfil its international obligations in 2010 as regards limiting emissions (ECE and the EU). These limits are (tonnes per year): SO_2: 55,000; NO_X: 127,000; NH_3: 69,000; and VOC: 85,000. As SO_2 and NO_X are typically transferred over long distances, emissions must be limited by means of international collaboration. SO_2, NO_X and O_3 also affect health and are subject to air-quality regulations in new EU directives.

Indicator 6.2.2:

Ozone layer thickness

Source: The Danish Meteorological Institute



This indicator elucidates developments in relation to the objective of stopping ozone depletion high in the atmosphere. Anthropogenic emissions of ozone-depleting compounds, particularly the so-called CFCs, have degraded the atmosphere's ozone layer. When the ozone layer is depleted, more of the harmful ultraviolet radiation from the sun will reach the Earth. Greater levels of ultraviolet radiation over a longer period of time would be harmful to human beings, and marine plant plankton and the growth of agricultural crops may also be affected.

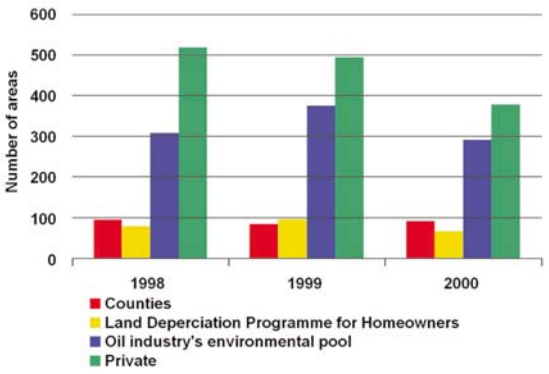
The figure shows that the ozone layer over Denmark has been depleted by approximately 0.4 per cent per year on average throughout the last 20 years. The greenhouse effect is expected to entail a cooling of the ozone layer, which could lead to further depletion in future. It will be several years before there are discernible signs of the ozone layer being restored, and the ozone layer will possibly not be fully restored until the middle of this century.

Efforts to protect the ozone layer are coordinated internationally by the Montreal Protocol under the UN Environment Programme. So far, the results of these endeavours have been successful. Use of ozone-depleting compounds has fallen considerably – by approximately 60–80 per cent when calculated in terms of the ozone-depleting effect. It has been decided that use of these substances must be phased out altogether. Since 1986, Danish consumption has been reduced by almost 98 per cent.

Indicator 6.2.3:

Number of sites where remediation of soil contamination has been carried out in order to enable housing and/or drinking water supply (number of remediations per year and analysed by types of financing)

Source: The Danish Environmental Protection Agency



This indicator illustrates trends regarding the efforts against soil contamination. The indicator shows the number of remediations carried out from 1998 to 2000, analysed by different types of financing. The need for remediation of soil contamination has been calculated from 1998 onwards and is estimated to extend to 14,000 sites. Funding for the remediation projects comes from the counties, the Land Depreciation Programme for Homeowners, the Oil Industry's Environmental Pool, private remediation projects, DSB (Danish State Railways), and the armed forces.

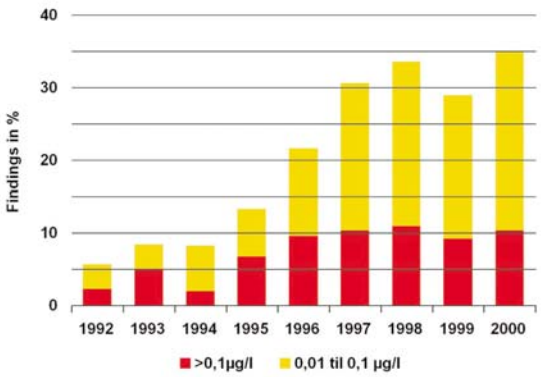
The indicator shows that the number of remediations has remained relatively stable since 1998, with a slight fall in 2000.

The efforts aimed against soil contamination have given rise to a quite stable development as regards the number of remediations. It is important to maintain the effort against soil contamination. Steps must be taken to ensure that soil contamination in residential areas and contamination which may threaten present or future drinking water supply do not cause any health problems.

Indicator 6.2.4:

Number of occurrences of pesticides in groundwater used for drinking water

Source: GEUS, Groundwater Monitoring 2001



This indicator illustrates trends regarding the efforts to ensure clean drinking water. The limit value for pesticides and their breakdown products is 0.1 micrograms per litre. This limit value was originally set in the EU Drinking Water Directive and corresponded to the detection limit of the method of analysis used at the time. The limit value has been retained on the basis of a desire to allow only very low pesticide contents in drinking water. This is to say that the limit value has not been set on the basis of a health assessment of the substances.

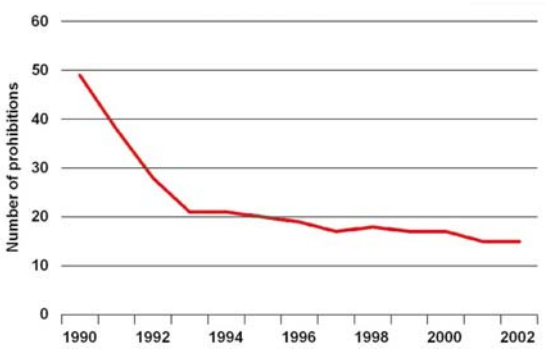
During the last four years, the relative share of water-supply borings contaminated by pesticides has been relatively constant. Pesticides are found in approximately one third of all borings – and the limit value for drinking water is exceeded in one in ten borings.

The objective is to retain a water supply system based on recovery of clean groundwater without any need for sophisticated water treatment. In this regard, it is worth noting that the pesticides and breakdown products most frequently found in extraction borings are substances which are already banned in Denmark, and which have not been commercially available for several years.

Indicator 6.2.5:

Bathing areas where water quality is so poor that bathing is not recommended

Source: The Danish Environmental Protection Agency



This indicator elucidates developments in the efforts against dispersion of pathogenic micro-organisms in the environment. Bans on bathing are issued for sites where water is so polluted that there is a risk that bathers may become ill. Bans on bathing are lifted when the cause of the deterioration of the water has been removed, and when it has been documented that the water quality is acceptable. The bathing bans issued in any given year are based on the results from the year before.

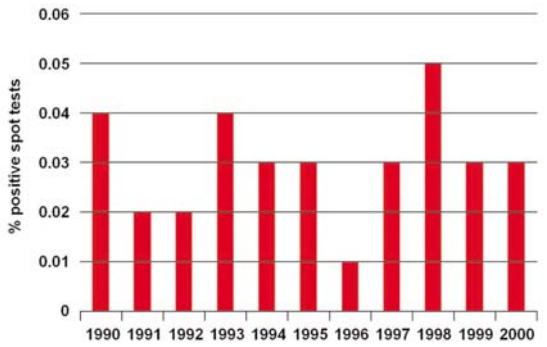
The number of bans against bathing has fallen steadily since the beginning of the 1990s, to a point were the level of bans corresponds to just 33 per cent of 1990 levels. This reflects a general improvement in water quality, and is a sign that efforts by local authorities to eliminate the causes of pollution have worked.

The objective is that pathogenic micro-organisms may not be dispersed in the environment to such an extent that they cause illness. As a result, the efforts to improve beach-water quality even further are retained. One particular objective is to reduce the number of areas with poor water quality.

Indicator 6.3.1:

Level of selected incidences of chemical pollution in food

Source: The Danish Ministry of Food, Agriculture and Fisheries



This indicator illustrates developments in safety assessments, risk analyses and control of chemical pollutants and chemicals used in production. The Danish Veterinary and Food Administration takes samples of food in order to examine their content of chemical pollutants. This indicator shows the number of positive samples in per cent. The figures from 1999 and 2000 include only transgressions of limit values and unresolved cases. Previously, all finds were registered as positive.

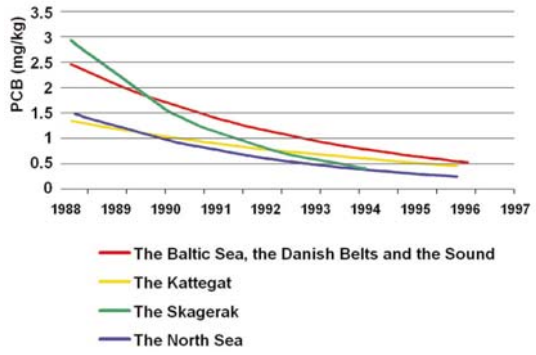
During the period 1990 to 2000, a total of between 0.01 per cent and 0.05 per cent of the samples taken yielded positive results. The variations in frequency show no significant increase or reduction. Each year, a very small number of samples show traces of antibiotics and/or chemotherapeutics.

From 1990 to 1997, samples were taken as random samples. In 1998 the sampling process was rendered target-specific because the EU established requirements regarding substance groups and the number of analyses carried out, and the final sampling plan would be determined on the basis of the Danish Veterinary and Food Administration's knowledge about the use of veterinary medicine, experience with veterinary practices, and on cases regarding violations of applicable rules. The control of chemical pollutants in production will be continued and strengthened.

Indicator 6.3.2a:

PCBs in cod liver from Danish waters 1988-2000

Source: The Danish Ministry of Food, Agriculture and Fisheries



This indicator illustrates developments in relation to control of chemical pollutants. The figure illustrates the trend regarding PCB contents in cod liver from Danish waters and is an indicator of PCB contents in fish in general. PCBs appear as organic pollution and may be concentrated and accumulated in fat tissue in fish and animals via the food chain. Humans are mainly exposed to these substances via their diet, primarily when eating animal fats or fish.

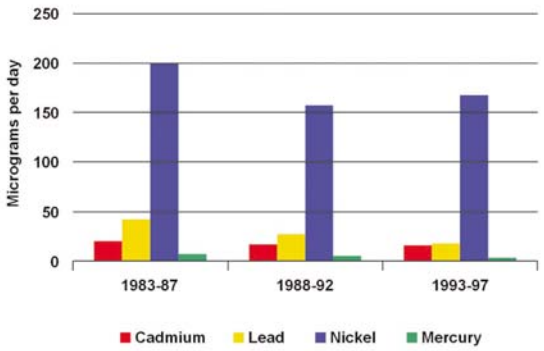
PCB concentrations have fallen significantly. Restrictions on the use of PCBs were introduced in Europe in the 1980s, and this has brought about a significant reduction in pollution of the marine environment. As regards Denmark, the reduction in PCB concentrations is most clearly apparent in the Baltic and in Danish waters. Data from the years 1998 to 2000 correspond to the levels seen during the period 1993 to 1996, so it appears that the levels are stabilising.

As a result of the international crises concerning contamination of foods and animal feed with PCB and other chlorine substances, e.g. dioxin, greater attention is now focused on food safety within the EU. Particular attention is paid to organic pollution and the importance of monitoring schemes, as well as on potential establishment of limit values. During the same period, stricter assessments have been applied on the issue of how much PCB humans can be exposed to without giving rise to health concerns.

Indicator 6.3.2b:

Consumption of 4 heavy metals in Danish diets (all foods) in three 5-year monitoring periods analysed in micrograms per day

Source: The Danish Ministry of Food, Agriculture and Fisheries



This indicator elucidates developments pertaining to contents of heavy metals in food. Contents of the hazardous heavy metals cadmium, lead, mercury, and nickel and consumption hereof have been monitored since 1984 in the Danish Monitoring System for Food. The monitoring process has involved all food categories, and consumption levels have been calculated by combining the monitoring results with results from the Diet Survey. The figure above illustrates consumption levels during three monitoring periods.

The consumption statistics indicated for the four heavy metals reflect two different trends. Lead and mercury exhibit a downward trend over 15 years, which corresponds to the environmental efforts made against emissions of these two substances during the same period. Despite the fact that intense environmental efforts against cadmium were carried out during the same period, consumption of cadmium and nickel fell only slightly. The reason for this may be that cadmium and nickel both appear naturally in soil in considerable quantities, and are absorbed by plants. The substances are then subsequently consumed by animals and people as they eat the plants.

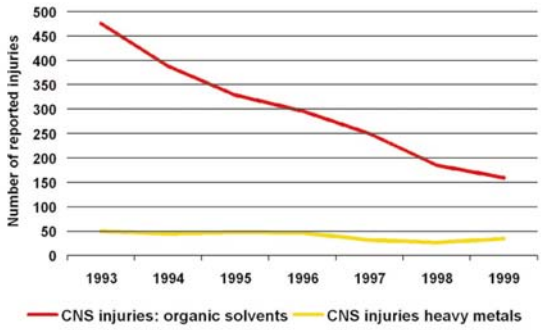
The observed reductions in consumption of certain heavy metals notwithstanding, it should be emphasised that the toxicologically determined limits for harmful effects (no safety factor) are also diminishing. As regards lead, the main cause for concern is

children being exposed to lead via food, water, and environmental sources. With respect to cadmium, special attention is focused on the group of women suffering from iron deficiency, which leads to increased absorption of cadmium. Methyl mercury may cause reduced intelligence in children, and inorganic arsenic in food may increase the risk of e.g. skin cancer. International trends point towards more restrictive assessments of the potential health hazard presented by substances, as well as to studies of the chemical compounds of heavy metals relevant to the harmful effects.

Indicator 6.4.1:

Selected reported work-related disorders

Source: Danish Register of Industrial Injuries



This indicator illustrates developments in relation to the objective that work-related injuries caused by exposure to chemical substances, organic solvents or heavy metals must be avoided. The number of CNS injuries (brain damage incidents) reported to the National Working Environment Authority is an indicator for the level of exposure to solvents and/or heavy metals.

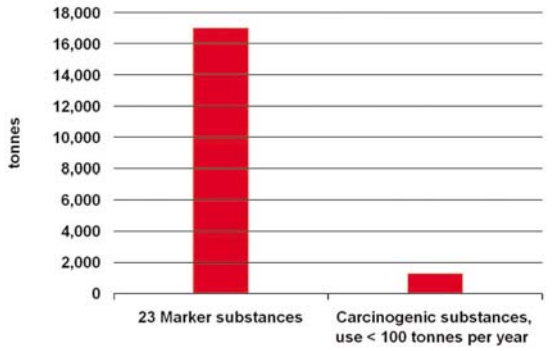
During the last ten years, the extent of work-related exposure to solvents has fallen. No trend can be observed as regards the number of reported cases of brain damage related to heavy metals. It is estimated that the increased focus on reducing consumption of solvents and on substituting less harmful substances are important reasons behind the overall reduction.

In order to sustain the decline in the number of brain damage cases caused by work-related exposure to solvents, it is important to maintain the dialogue with enterprises as regards substitution of solvent-based products with water-based. As regards heavy metals, there is also a need for phase-outs, and common work-hygiene initiatives are to prevent exposure and impacts.

Indicator 6.4.2:

Consumption of carcinogenic compounds by industries (total commercial consumption)

Source: The Product Register



This indicator illustrates developments in relation to the objective that work-related injuries caused by exposure to chemical substances, organic solvents or heavy metals must be avoided. Substances which are used commercially in quantities of 100 tonnes or more per year have been selected as markers of the use of carcinogenic substances in Denmark. This does not include petrol, quartz (sand), tar compounds, or crude oil etc. The 23 substances can be found within the following substance groups: chlorinated solvents, heavy metals, formaldehyde, and others. The consumption of these substances can serve as an indicator for exposure to carcinogenic substances.

In 1999, the total calculated consumption of such compounds was approximately 17,000 tonnes. As yet, no definite decline can be observed for the substances in general. A downward trend can, however, be observed for individual substances such as chlorinated solvents. This is to say that the year 1999 must be regarded as the base year for future monitoring of the selected working-environment indicators.

The objective is to avoid work-related injuries caused by exposure to carcinogenic compounds. Work will be carried out to develop more and better indicators for the working environment.

7. Resources and resource efficiency

Objectives

It is necessary to utilise the resources of nature. They are used as production and consumption input. Resources form the basis of increased welfare. Sustainable development entails that increased welfare takes account of the Earth's ecosystems and the amount of renewable and non-renewable natural resources.

A long-term objective is to increase resource efficiency significantly during the course of one generation. First of all, we must limit the use of natural resources that are scarce, particularly vulnerable, or particularly harmful to the environment when used. The UN Secretary General has pointed to changes in production and consumption patterns as a significant challenge on the way towards sustainable development. In this connection, he indicated decoupling and more efficient use of resources by a factor of 4 and 10 as goals. As part of the Danish Government's efforts to achieve sustainable development and sustainable production and consumption patterns, a long-term target has been set: to limit resource consumption to about 25 per cent of the current level. There is a need for further specification of initiatives concerning the use of resources in the future.

Developments — a summary

Following a period of atypical increases in raw-materials extraction in Denmark of sand, gravel, stone, lime, clay, etc. during the first half of the 1990s, the trend is now headed in the right direction. The fluctuations were caused by major construction projects, e.g. the bridges across the Great Belt and the Sound. Long-term resource economising within the raw-materials area should primarily be linked to the way we consume natural resources, e.g. through minimisation of actual consumption and more efficient use of resources available.

In recent years, the use of substitution materials instead of newly extracted raw materials (specifically in the form of recycling of building materials and residual products from power plants) has accounted for 6 to 7 per cent of total extraction from land and sea. Since 1996, there has been a slight decline in the recycling of residual products from power plants. In 2000, recycling of building and construction materials was almost back at the levels seen in 1996, when recycling peaked.

The indicator TMR (Total Material Requirement) illustrates the total use by a given country of the world's resources. TMR is one of many indicators which illustrate the extent of resource consumption. A decline in the TMR combined with greater economic growth constitutes a positive signal that a country is able to utilise its resources in an efficient manner. It does not, however, necessarily say anything about the environmental impact caused by the resource use.

The TMR1997 for Denmark has been calculated at 70 tonnes per capita. This figure is based on data from 1997 and constitutes the first proposal for an indicator for the total Danish drain on domestic and foreign resources. The TMR1997 for Denmark is significantly larger than the average figure for EU Member States, which is 50 tonnes per capita. The Danish resource drain corresponds to that of Germany (1996) and the Netherlands (1994). Japan (1994) is one example of a country which has a lower resource drain than Denmark.

Overall, GDP and waste volumes were completely proportional during the period 1994 to 2000, with an increase of 17 per cent. When considering the fluctuations during the period, there was a relative decoupling between total waste volumes and economic growth during the period 1996 to 2000. This relative decoupling was, however, primarily the result of a reduction in waste volumes from power plants and the building and construction sector. If these two sectors are excluded from the calculations, we see that the waste volume grew from 1997 to 1998. Waste production has not been successfully decoupled from economic activities in the individual sectors within households, industries, and the service sector.

We have become better at utilising the resources hidden in our waste. In 2000, a total of 65 per cent of all waste was recycled, while the corresponding 1994 figure was 56 per cent. Similarly, the percentage of waste deposited at landfills fell by 13 percentage points during the same period.

Today, the estimate of the reserves of crude oil is considerably higher than the 1990 estimate, even though production has been high during the last ten years.

Denmark is among the countries where land area is exploited most intensively. The total agricultural area has not changed significantly in the last 50 years. The natural areas have, however, decreased. They are mainly reduced due to urban development and houses, roads, and other structures in open countryside, all of which take up increasing amounts of space. Greater emphasis on afforestation has increased woodland areas in Denmark. Work is being carried out to ensure a more holistic approach to area usage, including concerns for nature.

Perspectives for development of indicators

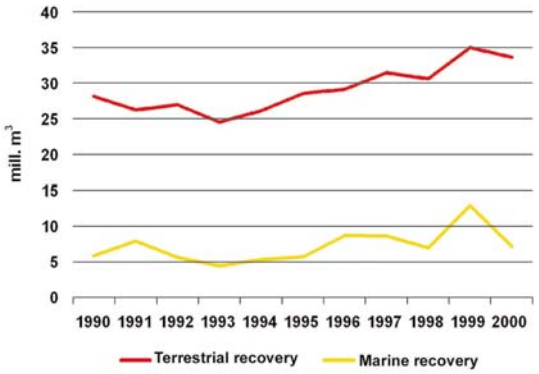
Work is being carried out at national and international levels to develop better indicators for elucidating the significance of materials consumption and material flows in terms of environmental impacts. Improvements in methods and results from this work will be incorporated in the set of indicators for sustainable development. For example, total resource consumption could be analysed by non-renewable and renewable resources, and it would also be possible to monitor consumption of selected resources such as concrete, iron, and aluminium. In addition to this, assessments will be carried out on the opportunities for developing one or more indicators capable of describing developments regarding resource efficiency and intensity

As the area data improve, there will be a basis for a more detailed indicator for area utilisation.

Indicator 7.1:

Denmark's total consumption of selected resources (raw and ancillary materials)

Source: Statistics Denmark



This indicator has been chosen to elucidate developments in relation to the objective about reducing resource consumption. The figure shows Denmark's consumption of selected domestic resources, analysed by extraction from land and sea.

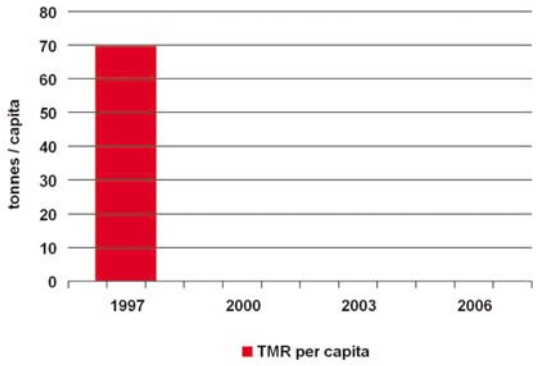
During the first half of the 1990s, raw-materials extraction in Denmark of sand, gravel, stone, lime, clay, etc. remained relatively stable at approximately 30–32 million m³ per year. Following this, the extraction of raw materials rose to 37-38 million m³ up until the steep increase in 1999 to 48 million m³, which can only be described as atypical. The increases observed in the period leading up to 1999 were primarily caused by the construction of the bridges across the Great Belt and the Sound, whereas the 1999 increases were mainly the result of the expansion of Aarhus port. Following the completion of the expansion of the port in 2000, levels dropped once again to correspond to the levels seen in the early 1990s. In recent years, the use of substitution materials instead of newly extracted raw materials (specifically in the form of recycling of building materials and residual products from power plants) has accounted for 6 to 7 per cent of total extraction from land and sea.

The objective is to reduce resource consumption. Following atypical increases in 1999, the trend is once again headed in the right direction. Long-term resource economising within the raw-materials area should primarily be linked to the way we consume natural resources, e.g. through minimisation of the actual consumption and more efficient use of the resources available.

Indicator 7.2:

Total material requirement (TMR) per capita

Source: Statistics Denmark



The indicator TMR (total material requirement) illustrates the total use by a given country of the world's resources. It is just one of many indicators which illustrate the extent of resource consumption. The advantage of using the TMR is that this indicator includes the resource drains occasioned by a given country's economic activities within and outside of its national boundaries. A drawback common to all indicators for resource drains is the fact that they do not say anything about the impact on the environment caused by the resource drain.

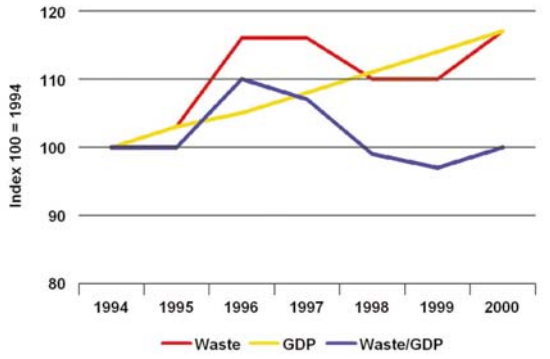
The TMR1997 for Denmark has been calculated at 70 tonnes per capita. This figure is based on data from 1997 and constitutes the first preliminary proposal for an indicator for the total Danish use of domestic and international resources. The TMR1997 for Denmark is significantly larger than the average figure for the EU Member States, which is 50 tonnes per capita. The Danish resource use corresponds to that of Germany (1996) and the Netherlands (1994). Japan (1994) is one example of a country which has a lower resource drain than Denmark. One of the primary reasons why the Danish drain on resources is so large is the large imports of coal.

Only one TMR indicator for one year has been established as yet, and so it is not possible to trace trends regarding the Danish resource drain. A decline in the TMR combined with greater economic growth constitutes a positive signal that a country is able to utilise its resources in an efficient manner.

Indicator 7.3:

Developments in waste generation and GDP

Source: The Danish Environmental Protection Agency and Statistics Denmark.



This indicator illustrates trends as regards environmental impacts from waste. Among other things, waste generation depends on economic activity within society.

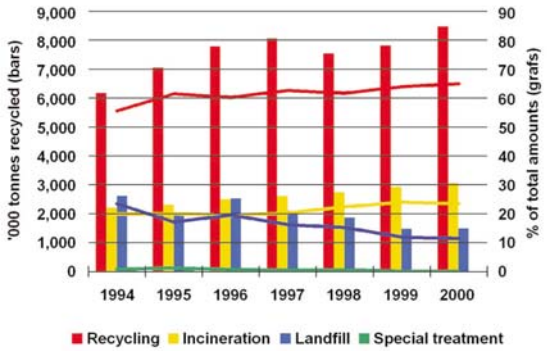
Overall, GDP grew by 17 per cent during the period 1994 to 2000. Waste volumes also increased by 17 per cent during the same period. The waste volumes did, however, decrease during the period 1996 to 1999. This means that the waste intensity (waste generation in relation to GDP) also fell during this period. Even so, the waste intensity rose again from 1999-2000 due to greater waste volumes.

Increases in production and consumption will increase waste volumes. Sustainable development means that we must decouple economic growth from waste generation. There was a relative decoupling between total waste volumes and economic growth during the period 1996 to 2000. The reduction in the total waste volume from 1997 from 1998 was, however, primarily the result of a reduction in waste volumes from power plants and the building and construction sector. If these two sectors are excluded from the calculations, we see that the waste volume grew from 1997 to 1998.

Indicator 7.4:

Waste volume recycled in absolute figures and in relation to total waste volume in Denmark

Source: ISAG (Information System for Waste and Recycling), the Danish Environmental Protection Agency



This indicator illustrates trends as regards environmental impacts from waste. The figure shows the developments in waste volume and method of treatment. Waste is resources which are about to be lost. This is why waste generation must be prevented. All treatment of unavoidable waste must be based on the treatment hierarchy. This is to say that recycling should be favoured over incineration with energy utilisation, which in turn should be favoured over land filling.

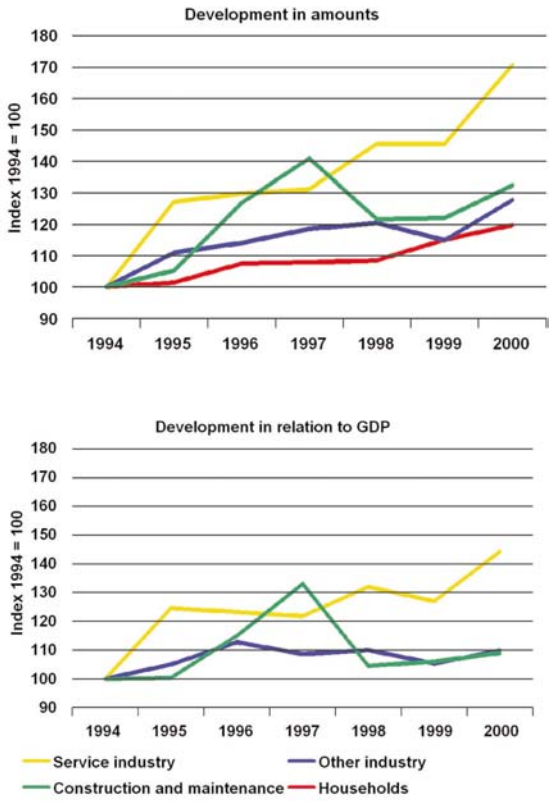
In 2000, a total of 8,461,000 tonnes of waste, corresponding to 65 per cent of all waste generated in Denmark, was recycled. This constitutes an increase of 2,287,000 tonnes or 9 per cent when compared to 1994 figures. Similarly, the percentage of waste deposited at landfills fell by 13 per cent during the same period. This is very much the result of Denmark's use of economic tools in support of the treatment hierarchy: recycling waste does not attract tax, whereas incineration and land filling both attract taxes, with land filling as the most expensive alternative.

In relation to the strategy's objective regarding efficient use of resources, the figure shows that we have become steadily better at exploiting the resources represented by waste. This applies to resources in terms of materials as well as energy.

Indicator 7.5:

Waste volume in Denmark from the following 4 sectors: households, services, industry, and building and construction; analysed in absolute figures and in relation to financial activity in the sectors

Source: The Danish Environmental Protection Agency and Statistics Denmark.



This indicator elucidates correlations in the development of waste volumes and economic growth. The trends within waste intensity (waste generation in relation to the GDP) illustrates whether economic growth has been decoupled from waste volumes.

As the top part of the figure shows, the trends regarding waste generation are quite different within the various sectors. At one extreme, waste volumes from households increased by 20 per cent and waste volumes from services increased by 70 percent. Generally speaking, waste volumes have increased as economic activity increased within each sector. Thus, waste intensity within the service sector grew throughout the entire period. Within the building and construction sector waste intensity increased up until 1997. After that time, reduced waste volumes caused a radical decrease from 1997 to 1998. Since 1998, the waste intensity has increased again, albeit at a slower rate.

Among other things, waste generation within the various sectors depends on the economic activity within the sector in question. Increases in production and consumption will increase waste volumes. Sustainable development means that we must decouple economic growth from waste generation. Except from within the building and construction sector, where the waste intensity decreased from 1997 to 1998, waste generation has not been successfully decoupled from economic activities within the individual sectors.

Indicator 7.6:

Recycling in the building and construction sector as a percentage of extracted raw materials

Source: Statistics Denmark

This indicator elucidates the use of raw materials in Denmark. The figure illustrates the extent of recycling of materials for building and construction. Recycling of building materials primarily concerns concrete and tiles from demolition sites. These materials are crushed and reused as gravel, gravel for road construction, and stone. Residual products from power plants in the form of plaster, cinders, and flues are also used as substitutes for freshly extracted raw materials.

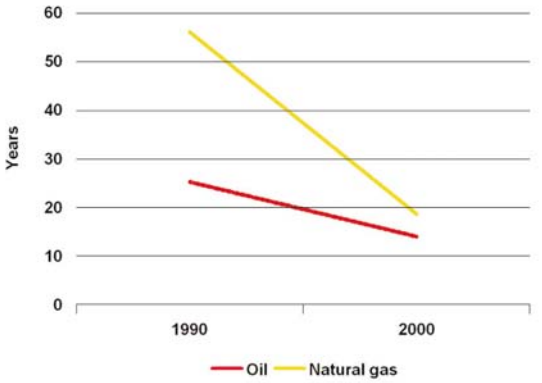
In recent years, recovery of building materials and use of residual products from power plants instead of newly extracted raw materials has accounted for 6-7 per cent of the total extraction from land and sea. Approximately two-thirds of all substitution materials come from the building and construction sector, whereas residual products from power plants account for the remaining one-third.

The objective is to realise sustainable use of raw materials. Since 1996, recovery of residual products from power plants has shown a slight decline. Following decreases in 1998 and 1999, recovery of building and construction materials in 2000 was almost back at the levels seen in 1996, when recycling peaked.

Indicator 7.7:

Known reserves in the North Sea in relation to the current annual production of oil and gas, respectively

Source: The Danish Energy Authority



This indicator sheds light on the relationship between the known reserves in the North Sea and the current annual production as regards oil and natural gas. The reserves of crude oil and natural gas have been calculated as the quantities which can, within an overall economic framework, be extracted by means of known technology.

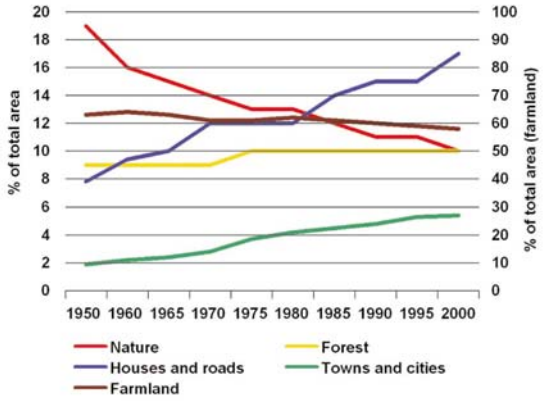
Since 1990, the estimated size of reserves of oil and gas has increased. At the same time, production has gone up, which means that the curves show a downward trend. At the end of 2000, the total reserves of crude oil and natural gas have been estimated at 299 million m^3 and 144 billion m^3, respectively. This corresponds to 14 years of crude-oil production and 19 years of natural-gas production if activities continue at the levels observed in 2000.

As part of the efforts to reduce consumption of oil and gas reserves, the Government aims to develop renewable energy sources.

Indicator 7.8:

Development in area utilisation (km²) analysed by the following area types: nature, forest, farmland, houses, and roads in the countryside and in towns and cities

Source: Natur og Miljø, 2001



This indicator elucidates developments in area utilisation. The figure illustrates area utilisation (km²) analysed by the following area types: nature, forest, farmland, houses, and roads in the countryside and in towns and cities

The total agricultural area has not changed significantly in the last 50 years. The natural areas have, however, grown smaller. They are mainly pushed back by urban development and houses, roads, and other structures in the open countryside, all of which take up increasing amounts of space. Greater emphasis on afforestation has increased the woodland areas in Denmark.

Denmark is among the countries where the land area is exploited most intensively. Agriculture accounts for 58 per cent of Denmark's total area, and today only ten per cent of Denmark is covered by natural areas such as dunes, dry grasslands, moors, marshland, and lakes. As a result of the developments in area utilisation, nature has less space, contains too many nutrients and too little water, and the natural areas are segregated and in the process of becoming overgrown. Work is being carried out to ensure a more holistic approach to area utilisation which also includes concerns for nature.

8. Denmark's international activities

Objectives

Denmark's vision for regional and global sustainable development foresees a Europe and a world enjoying economic progress, increased welfare and better environmental protection. It encompasses a world market with free trade, based on high environmental and social standards coupled with respect for human rights, democratisation, openness and administrative accountability.

Through both its foreign and environment policy, Denmark will work actively to promote international endeavours. Danish international assistance is well in excess of the UN target of 0.7 per cent of GNI. Denmark considers it important to maintain coherence between development, environment, and trade policy.

Denmark favours a strong global structure aimed at promoting all the elements of global sustainable development, including a structure that furthers international environmental cooperation and regulation. Denmark will work towards a global deal on sustainable development and global partnership.

Developments — a summary

With its extensive international efforts, Denmark lives up to its national visions on contributing to combating poverty in the world. The Danish objectives for promoting global, sustainable development are closely linked to the international development targets set by the UN, and they support these targets.

During the period 1999 to 2001, Denmark contributed approximately 1 per cent of its GNI every year, which is far more than the UN target of 0.7 per cent of the GNI. In 2001, environmental assistance accounted for approximately 0.09 per cent of the GNI, and this figure has increased during the years 1999–2001.

A small majority of the countries receiving assistance from Denmark (development assistance; environmental assistance for developing countries and Central and Eastern European countries) have followed the call issued by the UN Conference for Environment and Development (UNCED) in 1992, encouraging all countries to prepare national strategies for sustainable development.

Perspectives for development of indicators

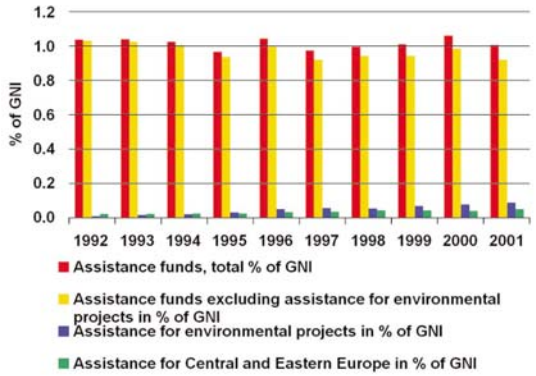
As regards Danish assistance to Central and Eastern European Countries and developing countries, work is being carried out to further develop an indicator system for the results of this assistance. This system will be based on indicators which the recipient countries themselves have an interest in calculating, and will be selected in close collaboration with the partner country. Ownership of the data will fall to the recipient country concerned.

Work is carried out on developing indicators, at national and international levels. One challenge is to ensure consistent quality and comparability of data within and across national boundaries, as well as the efforts to arrive at international agreement on these issues. The work carried out within the OECD on establishing indicators which can be used as a basis for the annual economic reviews are expected to be completed (at a pilot stage) in time to contribute to the Johannesburg Summit on Sustainable Development in August/September 2002.

Indicator 8.1:

Assistance funds as a percentage of GNI, in total and analysed between development and environmental assistance, and assistance to neighbouring countries

Source: The Ministry for Foreign Affairs and the Environmental Protection Agency



This indicator elucidates Denmark's international efforts. The figure presents an account of the development in assistance in accordance with the calculation rules used by the OECD development committee, the DAC. The figure also shows the relative funds spent on environmental assistance (as a percentage of GNI) and other development assistance (total assistance excluding environmental assistance) as a percentage of GNI. Environmental assistance can be funded via official development assistance (of which 15 per cent is allocated to projects for environmental improvement) as well as via the MIFRESTA (Environment Peace and Stability Fund) framework.

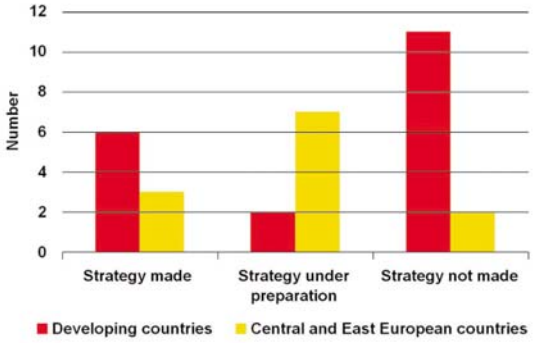
During the period 1999 to 2001, Denmark contributed approximately 1 per cent of its GNI every year, which is far more than the UN target of 0.7 per cent of the GNI. In 2001, environmental aid accounted for approximately 0.08 per cent of GNI, and this figure has increased during the years 1999–2001.

With its extensive international efforts, Denmark lives up to its national visions on contributing to combating poverty in the world. The Danish objectives for promoting global, sustainable development are closely linked to the international development targets set by the UN, and they support these targets.

Indicator 8.2:

Number of developing countries and Central and Eastern European countries which have national strategies for sustainable development and which receive assistance from Denmark.

Source: The Ministry of Foreign Affairs



This indicator shows the number of countries receiving assistance from Denmark (development assistance; environmental assistance for developing countries and Central and Eastern European countries) which have followed the call issued by the UN Conference for Environment and Development (UNCED) in 1992, encouraging all countries to prepare national strategies for sustainable development. The special UN General Assembly in 1997 concerning follow-up to the UNCED (Rio +5) established 2002 as the target year for preparation of the strategies. The OECD target is that implementation of the strategies is ongoing in 2005.

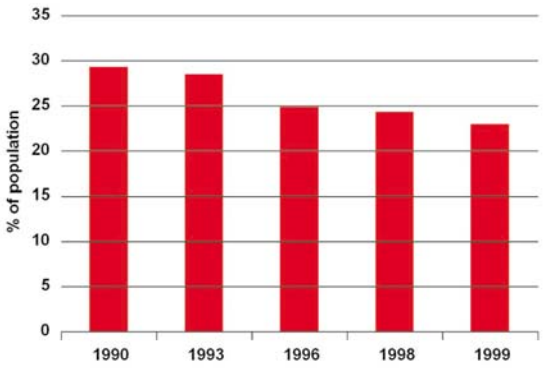
The indicator shows that the Central and Eastern European countries have made considerably more progress on preparing the strategies than the developing countries. This is undoubtedly because the Central and Eastern European countries have a great deal more resources at their disposal. Denmark directly supports preparation of the strategies in Uganda and Vietnam.

The value of these strategies as tools for implementation of sustainable development will very much depend on the weight attributed to them at the World Summit on Sustainable Development in Johannesburg in 2002, and on the decisions made by the Summit regarding future work on sustainable development. As regards developing countries, it is crucial that the strategies be incorporated in the national strategies for combating poverty (PRSP- Poverty Reduction Strategy Papers). Denmark supports this work in the Danish programme collaboration countries.

Indicator 8.3:

Number of people who live on less than USD 1 a day

Source: 2002 World Development Indicators, the World Bank



With the Millennium Declaration in 2000, the UN Member States committed to a number of international development targets, including targets for sustainable development. The Danish objectives for promoting global, sustainable development are closely linked to the international development targets set by the UN, and they support these targets. The UN, the OECD, and the World Bank have joined forces to establish a number of indicators, of which indicator 8.3 is shown as a background indicator for objectives concerning poverty reduction and sustainable development. The indicator for absolute poverty shows the percentage of people who live on less than USD 1 a day. The UN has adopted an objective which stipulates that the number of people living in absolute poverty, i.e. on less than USD 1 a day, must be halved during the period 1990 to 2015. This is why the time statistics commence in 1990.

There has been a decrease in the relative percentage of people living in absolute poverty on a global level, from 29 per cent in 1990 to 23 per cent in 1999. This is to say that developments during the 1990s were positive. The indicator does not, however, reflect large variations between regions, countries, and even within individual countries. Most of the progress made throughout the 1990s was occasioned by increased growth in a number of Asian countries, where the number of poor people fell significantly. At the same time, the number of poor people rose in other Asian countries and in other regions.

The figure reflects total global efforts made to combat poverty. The World Bank estimates that economic growth per capita in developing countries must increase by an average of 3.6 per cent per year if the number of poor people is to be successfully halved by 2015. This is to say that there is a need for a considerable boost in economic growth when compared to the average rate of growth in the 1990s, which was 1.6 per cent per capita per year on average.

9. Food production, food safety, agriculture and fisheries

Objectives

The objective for food production in Denmark is to ensure that the food produced and sold to consumers is healthy and of high quality and that the level of information on food is high. Production methods that preserve the resource basis of the agricultural and fisheries sectors and secure the environment, nature, animal welfare and good working conditions must be promoted. Simultaneously, cost-effective production and marketing should be promoted in the food-producing sectors.

Sustainable development of food production requires the right legislative framework, visionary utilisation and development of technological possibilities, and constructive interplay between the authorities, industry, and the public.

The Danish Government regards it as important that assessment of safety and risk in relation to food must be based on the precautionary principle in situations where scientifically based suspicions exist, but where a sufficient scientific basis for confirming or refuting such suspicions is not yet available.

Agricultural production must contribute to sustainable development and to life in rural districts. At the same time, terrestrial and marine biodiversity must be ensured. Agricultural development must be a balanced interplay between the environment, nature, and the local community.

The fisheries sector depends on fish stocks remaining a renewable natural resource. Sustainable fishing that helps safeguard marine fish populations and ecosystems will also contribute to the sector's future development.

Developments — a summary

The total number of food-related cases of illness in Denmark has increased constantly since 1990, from approximately 4,300 registered cases in 1990 to approximately 8,000 in 2001. Until 1999, salmonella was the most frequent cause of food-related illness. The year 1999 was, however, the first year ever where more incidences of illness caused by campylobacter than salmonella were registered. Various monitoring schemes and action plans have been initiated in order to obtain a high level of food safety.

In total, a number of environmental impacts from agriculture have been reduced in the last ten years. At the same time, production value within the agricultural sector has grown by 20 per cent from 1988 to 1998. This is to say that there has been economic growth without a corresponding increase in environmental impacts. Energy consumption within agriculture has increased almost as much as the production value. The number of farm animals per hectare farmland (livestock) has risen from 1.07 to 1.23. Agricultural emissions of ammonia, which may cause acidification and excessive nutrient contents in natural areas, are down by 20 per cent, but further reductions are needed in order to meet the targets.

The agricultural sector uses nitrogen and phosphorus in the form of e.g. commercial fertilisers and livestock manure. Some of these nutrients are bound up in animal production and crops. The remaining materials are known as surplus nutrients. Surplus nitrogen and phosphorus from agricultural production can have a negative impact on nature and the environment. During the period 1985 to 1999, the total nitrogen surplus within the agricultural sector fell by approximately 24 per cent, while the total phosphorus surplus fell by approximately 36 per cent. Following an adjustment (in 2000) of the initiatives already implemented, it is expected that the objectives of the Action Plans for the Aquatic Environment I and II, which were launched in order to reduce the nitrogen surplus, will be reached in 2003. Opportunities for limiting agricultural discharges of phosphorus will also be addressed in connection with the preparation of the Action Plan for the Aquatic Environment III.

Green accounts within agriculture raises awareness on resource consumption in day-to-day operation. Subsidies for green accounts were introduced in 2001, and approximately 340 farms were granted a subsidy. Simply by virtue of the areas covered by the green accounts, these accounts entail considerable improvements in the consumption of input factors which are relevant in connection with the Action Plan for the Aquatic Environment II and the Pesticides Reduction Action Plan.

The extent of agro-environmental schemes (MVJ) has increased since 1993. Since 1997, the scheme seems to have become stabilised around 75,000 hectares. The scheme is currently being adjusted, with the adjustments taking effect from 2003. The objective is to make it more attractive, thereby ensuring that even larger areas fall within the scheme. The actual area covered is directly related to the concrete effect in the form of reduction of discharges of nitrogen from agriculture.

The treatment frequency constitutes a measure of how many times a year the total agricultural area of a given country can be treated with the amount of pesticides sold if these pesticides are used in the standard doses recommended.

The treatment frequency peaked in the early 1990s, but has shown a decreasing tendency since then. In the early 1990s, the treatment frequency was approximately 3, which is to say that farmers treated their fields with pesticides three times a year. The Pesticides Reduction Action Plan II calls for a treatment frequency of less than two before the end of 2002. This target was almost met in 2000, where the treatment frequency was 2.0. After 2002, a new objective will be established to reduce application frequency even further.

The number of authorised organic farms has increased, particularly from 1995, which saw an increase of 55 per cent compared to 1994 levels. The year 1996 featured a smaller increase of 11 per cent, but for the period 1997 to 1999, the increase was approximately 39 per cent per year. The rate of increase has declined from 1999, arriving at a level slightly above 10 per cent. Seen in relation to the size of the country, Denmark's organic sector is among the largest in Europe.

The number of livestock farms decreased significantly during the period 1990 to 2000. This applies to harmonic and unharmonic farms alike. If the production of manure exceeds the norm, the farm is defined as unharmonic. If a farm does not have adequate area (owned or rented) suitable for fertilisation to satisfy the harmony rules, agreements must be made about disposal of manure. In view of the current developments in separation plants for semi-liquid manure, it must be expected that a larger percentage of unharmonic farms will be observed, as it will be possible to sell a larger percentage of the manure to others. Thus, more unharmonic farms cannot be regarded as a sign of increased environmental problems, since the requirements for harmony ensure manure is exported to other farms, such that it does not oversupply nutrients to the land of the farms in question.

When considered over a period of ten years, the indicators for fisheries show that improvements have been made as regards the spawning biomass. At the same time, however, they show that fishery has in most cases not been sustainable, as illustrated by fishing mortality.

For some fisheries, it is important that discards be documented better. The amounts of discards should be reduced, e.g. through development of selective and gentle fishing equipment.

It is estimated that the by-catches of porpoise in the North Sea have been reduced from approximately 7,300 in 1994 to approximately 3,900 in 2000 as a result of the general development in net fishing and the use of pingers (acoustic alarms) on fisheries tackle.

The capacity of the fishing fleet was significantly reduced during the first half of the 1990s, which means that total capacity is now approximately 20 per cent below the agreed ceiling; both in general terms and within each vessel category. The development conforms to the targets agreed within the EU.

Perspectives for development of indicators

The indicators presented above are available at present. The indicator set will be developed on an ongoing basis.

The EU has initiated extensive efforts to develop indicators for the economic, social, and environmental dimensions of sustainable agriculture and sustainable development of rural districts. The results of the international efforts will be incorporated in the national set of indicators.

There is a need for supplementing the indicator for the number and size (area) of organic farms with indicators for production or sales of organic products. For example, as soon as data on consumers' purchases or retailers' sales of organic products become available, these indicators will be included in the set.

As regards the role played by agriculture in terms of nature management, it may be relevant to develop an indicator which elucidates zoning of farmlands by various types of area. As nature plans become used and registered in all counties, they may be used as indicators.

There may be a need to continue development of the indicators in order to achieve greater certainty in calculations.

A clean marine environment is important in order to ensure the natural basis of fisheries. It would be relevant to assess the opportunities for developing indicators capable of elucidating the condition of the marine environment. Work will be carried out to investigate the opportunities for identifying particularly harmful impacts (pollution, etc.), and for registering the effect of initiatives aimed at reducing such impacts.

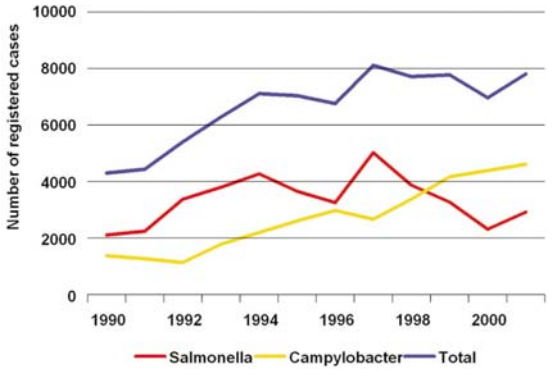
The national efforts made to develop indicators must be carried out while keeping informed of international considerations as regards selection and development of suitable indicators in order to elucidate sustainable development. Important discussions of these issues are being held within the EU and the ICES (International Council for the Exploration of the Sea).

9.1. Food safety

Indicator 9.1:

Number of incidences of illness caused by food

Source: Statens Serum Institut (the Danish serum institute)



This indicator serves to illustrate food safety. The figure shows the trend regarding incidences of illness for the most frequent causes of food-related illness: salmonella and campylobacter. It is estimated that the actual number of infections is 10-20 times higher than the diagnosed number of cases.

The total number of food-related cases of illness in Denmark has increased constantly since 1990, from approximately 4,300 registered cases in 1990 to approximately 8,000 in 2001. Until 1999, salmonella was the most frequent cause of food-related illness. The year 1999 was, however, the first year ever where more incidences of illness caused by campylobacter than salmonella were registered. These two types of bacteria account for the majority of all registered cases of illness caused by food.

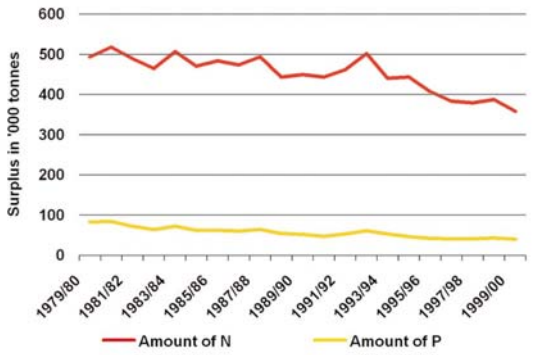
Various monitoring schemes and action plans have been initiated in order to achieve a high level of food safety. The programmes launched have been effective, as the number of salmonella infections has fallen strongly. The efforts have been followed up in the entire chain, from the animals to the consumer. The efforts aimed against campylobacter and salmonella will be continued in order to reduce the incidence of food-related illness.

9.2. Agriculture

Indicator 9.2.1:

Balance sheet of inputs and outputs of N and P

Source: The National Environmental Research Institute, Denmark and the Danish Institute of Agricultural Sciences.



This indicator elucidates the objective concerning agricultural loss of nutrients to the aquatic environment. Not all of the nutrients added in agricultural production are fully utilised. The difference between the inputs and outputs of nutrients constitutes a surplus which may be regarded as a potential loss. Loss of nitrogen and phosphorus can have a negative impact on nature and the environment.

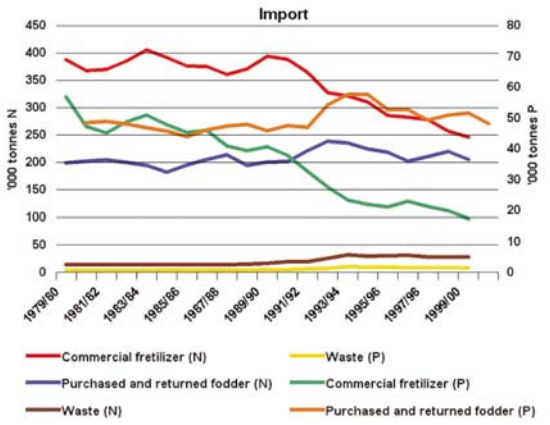
During the period 1985 to 1999, the total nitrogen surplus within the agricultural sector fell by approximately 24 per cent, while the total phosphorus surplus fell by approximately 36 per cent. However, the continued input of surplus nutrients means that phosphorus is accumulated in soil. The level of saturation is increased, and this causes an increased risk of losses into the aquatic environment.

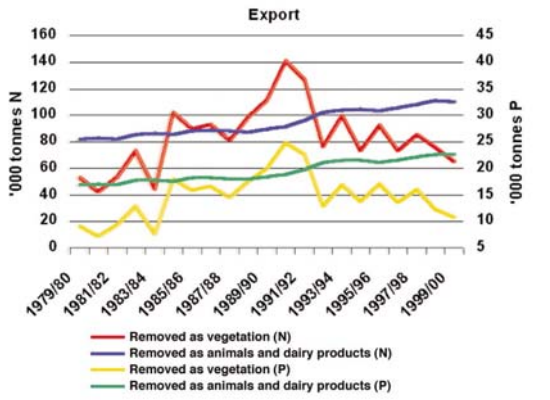
The objective stipulated in the Action Plans for the Aquatic Environment I and II is to reduce nitrogen runoffs from farmland by 100,000 tonnes N compared to the runoffs observed in the mid-1980s (230,000 tonnes N). This objective has been pursued through a number of action plans, e.g. Action Plan for the Aquatic Environment II from 1998. Following an adjustment (in 2000) of the initiatives already implemented, it is expected that the objective will be reached in 2003. The Action Plans for the Aquatic Environment do not include any targets for reductions in phosphorus losses from farmland. Nevertheless, further improvement of the condition of lakes and inlets requires that phosphorus discharges from agriculture be reduced.

Indicator 9.2.2:

Total imports and exports of N and P within the agricultural sector

Source: The Danish Environmental Research Institute and the Danish Institute of Agricultural Sciences.





The agricultural sector uses nitrogen and phosphorus in the form of e.g. commercial fertilisers and livestock manure. Some of these nutrients are bound up in the animal production and crops. Nutrients which are not removed from the farms in the form of meat, eggs, milk, or vegetable products are absorbed by the soil or lost to the surroundings. Losses in the form of ammonia evaporation are harmful to natural areas, and discharges of nitrogen and phosphorus into the aquatic environment may cause eutrophication. Nitrate runoffs may also cause contamination of drinking water.

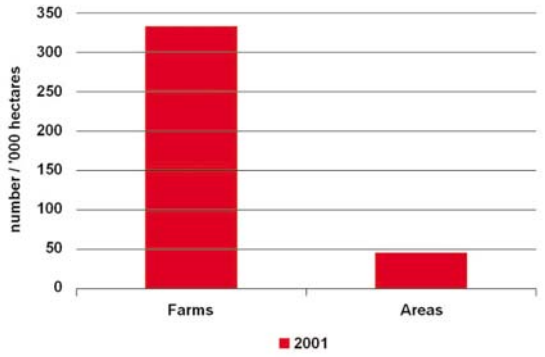
As regards nitrogen, imports of commercial fertilisers fell by 37 per cent during the period 1985 to 1999, whereas animal feed imports increased by 14 per cent. During the same period, exports of nitrogen decreased slightly. This means that utilisation of nitrogen inputs rose from approximately 28 per cent in 1985 to approximately 32 per cent in 1999. As regards phosphorus, imports of commercial fertilisers fell by 62 per cent during the period 1985 to 1999, whereas the import of animal feed increased by 9 per cent. During the same period, exports of phosphorus decreased slightly. This means that utilisation of phosphorus inputs rose from approximately 36 per cent in 1985 to approximately 45 per cent in 1999.

One objective within the agricultural sector is to improve utilisation of imported nutrients. Various action plans have contributed to achieving this objective, and have included efforts aimed at reducing consumption of commercial fertilisers, requirements regarding better utilisation of manure, and introduction of nitrogen norms for crops. The objectives stipulated in the Action Plans for the Aquatic Environment I and II were exclusively aimed at reducing nitrogen consumption, but regulations within the agricultural sector have also had an impact on the consumption of phosphorus. With a view to preparing the Action Plan for the Aquatic Environment III, and as a basis for continued efforts to limit agricultural impacts on the environment, work will be initiated to address not only nitrogen, but also the opportunities for limiting agricultural discharges of phosphorus.

Indicator 9.2.3:

Number of farms and areas which have green accounting/environmental management

Source: The Danish Ministry of Food, Agriculture and Fisheries



This indicator elucidates the role which agriculture plays in nature management. The figure illustrates the use of green accounting within agriculture in 2001, as illustrated by the total area and number of farms covered by agreements. Green accounting within agriculture raises awareness and focuses greater attention on resource consumption in day-to-day operation.

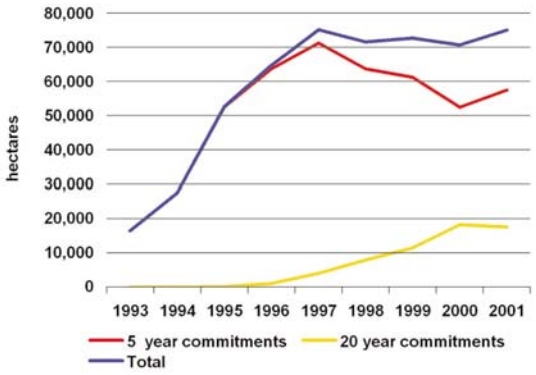
The possibility of applying for subsidies for preparing green accounts commenced in 2001. A total of 1,000 applications were anticipated each year, but this turned out to be an excessive estimate – certainly in relation to the first round of applications for the scheme. In 2001, approximately 340 farms received a promise for subsidies for preparation of green accounts, corresponding to a total area of approximately 45,000 hectares. It is estimated that several years will pass before general interest reaches the desired level.

Simply by virtue of the areas covered by the green accounts, these accounts entail considerable improvements in the consumption of input factors which are relevant in connection with the Action Plan for the Aquatic Environment II and the Pesticides Reduction Action Plan. It is expected that the greater awareness will result in less resource-intensive production to the benefit of nature, the environment, and farm finances.

Indicator 9.2.4:

Area with agro-environmental schemes (MVJ)

Source: The Danish Ministry of Food, Agriculture and Fisheries



This indicator elucidates the role which agriculture plays in nature management. The figure illustrates developments in the extent of agro-environmental schemes in the form of the number of commitments (agreements) regarding environmentally friendly agricultural production and the number of hectares covered. The actual area covered is directly related to the concrete effect in the form of reduction of discharges of nitrogen from agriculture. These figures have been calculated for 5-year and 20-year commitments, as the duration is crucial to the effect.

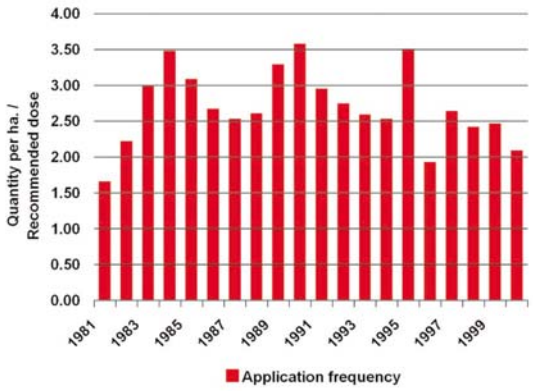
Since 1997, the extent of the commitments made appears to have stabilised around 75,000 hectares. This indicates a need for innovation as regards the forms of agreement in order to make the entire scheme more attractive. The scheme is currently being adjusted, with the adjustments taking effect from 2003.

It is expected that the scheme will contribute to achieving the objective outlines in the Action Plan for the Aquatic Environment II and to improving the quality of nature in the areas in question.

Indicator 9.2.5:

Application frequency for pesticides on conventionally cultivated areas

Source: Danish Pesticides Statistics



This indicator elucidates efforts to reduce pesticide consumption. The treatment frequency constitutes a measure of how many times a year the total agricultural area of a given country can be treated with the amount of pesticides sold if these pesticides are used in the standard doses recommended. The treatment frequency indicates the treatment intensity within agriculture, and also serves as an indicator for environmental impact. Several Danish studies have shown that there is a correlation between the treatment frequency and the population of animals and plants in agricultural areas.

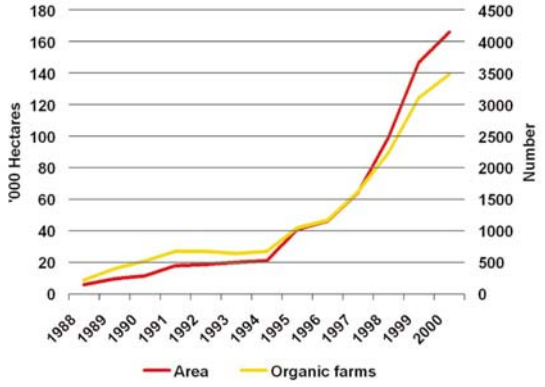
The treatment frequency peaked in the early 1990s, but has shown a decreasing tendency since then. In the early 1990s, the treatment frequency was approximately 3, which is to say that farmers treated their fields with pesticides three times a year. In 1998, the number of treatments had fallen to 2.3 times a year. Some years, e.g. 1995, show large fluctuations in the treatment frequency due to hoarding of pesticides which are about to be phased out.

The Pesticides Reduction Action Plan II calls for a treatment frequency of less than two before the end of 2002. This target was almost met in 2000, where the treatment frequency was 2.0. The results of the work carried out by the so-called Bichel Committee showed that it would be possible to reduce the treatment frequency further, to 1.4-1.7 without incurring any significant costs for farmers. The Government wishes to minimise pesticide consumption within the years to come. After 2002, a new target will be established with a view to reducing the treatment frequency even more.

Indicator 9.2.6:

Number and area of organic farms

Source: The Danish Ministry of Food, Agriculture and Fisheries



This indicator elucidates developments in the organic farming sector. The figure comprises the number of authorisations and the development in farm production area up until 2001. The data for this survey have been generated on the basis of the Danish Plant Directorate's monitoring of organic farms.

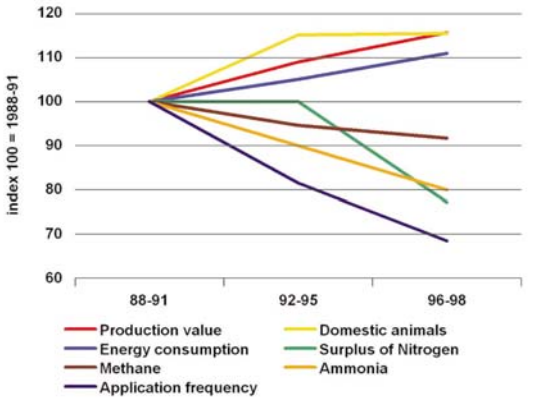
The number of authorised organic farms remained relatively constant during the period 1991 to 1994. The year 1995 saw a large net increase in the number of organic farms, corresponding to an increase of 55 per cent in relation to 1994. In 1996, there was a small net increase in the number of farms of 116 farms, corresponding to 11 per cent. The net increase for 1997 to 1999 was approximately 39 per cent per year. The net increase from 1999 to 2000 was 367 farms, corresponding to 11.8 per cent. In 2001, the net increase was 66. Generally speaking, the new applicants (276) have smaller farms and fewer farm animals than the established organic farmers. More detailed studies also reveal that half of all new applicants exclusively grow crops, which is a relative increase in relation to previous years. Greater production of organic grain, seed, and feeds is important in order to meet the requirement that as of 2005, all feed for organically farmed animals must be 100 per cent organic.

Denmark's organic sector is among the largest in Europe. As part of sustainable food production, the Government wants continued development of the organic sector based on consumer demand and common EU regulations.

Indicator 9.2.7:

Environmental impacts from agriculture as illustrated by energy consumption, frequency of pesticide treatment, number of livestock, methane emissions, ammonia losses, and nitrogen surpluses in relation to changes in value of production

Source: The National Environmental Research Institute, Denmark



This indicator elucidates developments pertaining to a range of environmental impacts within agricultural production. The figure shows indexed values in relation to index 100 in 1988-91.

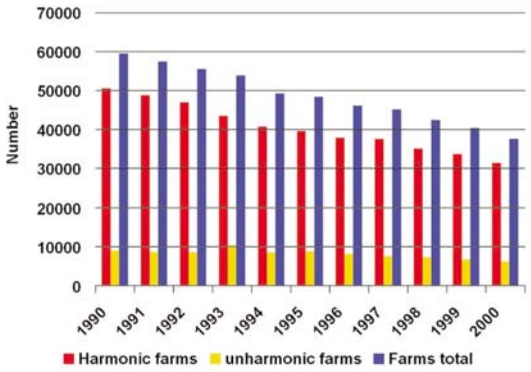
The agricultural production value has increased by around 20 per cent from 1988 to 1998 (1990 prices). Energy consumption within agriculture has increased almost as much as the production value. Agriculture accounts for approximately 18 per cent of Denmark's total emissions of greenhouse gases. The gases emitted by agriculture are mainly methane and laughing gas (nitrous oxide). Emissions of methane have been reduced by approximately 10 per cent. The number of farm animals per hectare farmland (livestock) has gone up from 1.07 to 1.23. Agricultural consumption of commercial fertilisers has decreased, and manure is being utilised more efficiently. As a result, the quantities of surplus nitrogen and phosphorus (inputs less outputs bound in crops, etc.) have fallen by more than 20 per cent. Agricultural emissions of ammonia have decreased by 20 per cent.

Overall, a number of environmental impacts from agriculture have been reduced in the last ten years, even as agricultural production has gone up. Agricultural emissions of ammonia, which may cause acidification and excessive nutrient contents in natural areas, are down by 20 per cent. Further reductions are, however, needed in order to meet objectives. Pesticide consumption has fallen more than the treatment frequency. This is because many of the pesticides used today are effective in very small doses. This entails lower quantities, but not necessarily lower impacts on the environment.

Indicator 9.2.8:

Number of farms, size and specialisation (harmonic and unharmonic farms)

Source: Statistics Denmark



The number of unharmonic farms is one of several indicators for the balance between manure generation and the size of farms (area). The distinction between harmonic and unharmonic farms is made on the basis of the amount of manure generated at each farm and the corresponding number of hectares suitable for fertilisation belong to the farm in question (owned and rented areas). Calculations are carried out in accordance with the rules in the Statutory Order on Manure. If the production of manure exceeds the norm, the farm is defined as unharmonic.

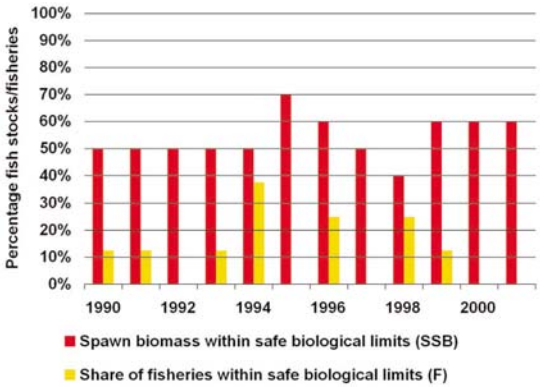
The figure shows that the number of livestock farms fell significantly during the period 1990 to 2000. This applies to harmonic and unharmonic farms alike. The percentage of unharmonic farms increases with the size of livestock production. The relative distribution has been relatively stable. For example, unharmonic farms accounted for a total of 18.1 per cent in 1994. The corresponding figure in 2000 was 16.4 per cent.

The number of unharmonic farms is likely to rise due to stricter harmony regulations. In view of the current development in separation plants for semi-liquid manure, it must be expected that a larger percentage of unharmonic farms will be observed, as it would be possible to sell a larger percentage of manure to others. Thus, more unharmonic farms cannot be regarded as a sign of increased environmental problems, since the requirements for harmony ensure manure is exported to other farms, such that it does not oversupply nutrients to the land of the farms in question.

Indicator 9.3.1:

The number of fish stocks where the spawning biomass (SSB) is within safe biological limits and the number of fisheries operated within safe biological limits (i.e. where fishing mortality (F) is within safe biological limits).

Source: Danish Institute for Fisheries Research



This indicator elucidates the objective concerning conservation of marine fish stocks and ecosystems. The SSB indicator measures the percentage of all stocks which are within safe biological limits, while the F indicator measures the percentage of fisheries operated within safe biological limits. The indicators have been calculated for the period 1990 to 2000 and cover ten stocks of great significance to Danish fisheries. No data for (F) is available for 1992, 1995, 1997, 2000 and 2001.

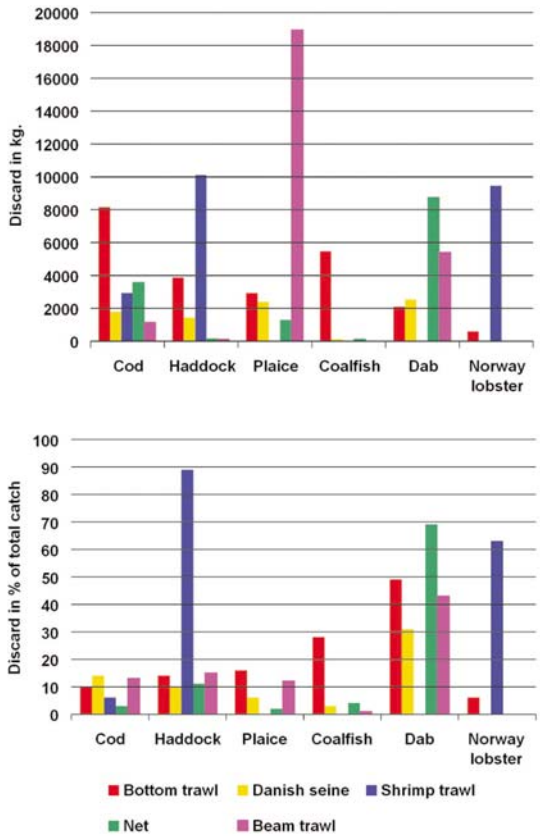
The diagram shows that an average of 50-60 per cent of the ten selected stocks have been within safe biological limits during the period 1990 to 2001 (the SSB indicator), and that a total of approximately 10 per cent of fisheries on the same stocks are operated within safe biological limits (the F indicator).

Seen over a ten-year period, the indicators show that the spawning biomass has improved during the last three years (SSB). In most cases, fishery expressed by fishing mortality F has in most cases not been sustainable. This means that the objective of having fishery carried out at a sustainable level has not yet been achieved.

Indicator 9.3.2:

The percentage of discards compared to the total catch (landings and discards) for selected species, analysed by the fishing equipment used. The data are based on samples (estimates) from selected fisheries in the North Sea, 1995-2000.

Source: Danish Institute for Fisheries Research



This indicator elucidates the objective concerning reduction of the amounts of discards. The figures show the discards for cod, haddock, plaice, coalfish, dab, and Norway lobster, analysed in terms of quantities and as percentages of total catch by fishery type. The data are based on spot tests. The figures only concern calculations for those fisheries in the North Sea where observers have participated during the period 1995 to 2000.

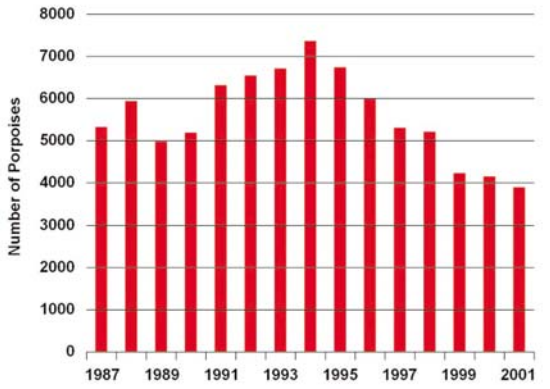
The calculations are subject to some uncertainty, but do indicate the levels of discards within the fisheries specified. It should be noted that relatively large variations in the amount of discards can be observed, depending on the species and tackle involved.

For fisheries involving stocks that are under pressure and where the amounts of discards are considerable, it is important to monitor and reduce discards. The data basis must be extended in collaboration between the countries participating in fisheries, and the efforts to reduce discards must be adapted to individual fisheries.

Indicator 9.3.3:

The extent of by-catches of porpoise (estimated) by Danish net fishing in the North Sea

Source: Danish Institute for Fisheries Research



This indicator elucidates the objective on avoiding by-catches of porpoise as far as possible. The figure shows the trend as regards the total Danish by-catches of porpoise in connection with net fishing in the North Sea. The figures have been calculated on the basis of sample data collected from commercial vessels by observers from Danish Institute for Fisheries Research. The rates of by-catches from the observed expeditions have been extrapolated to the total fleet on the basis of the overall fishing performance.

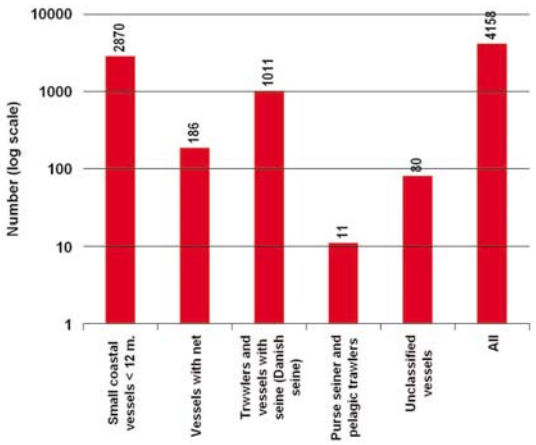
It is estimated that the by-catches of porpoise in the North Sea have been reduced from approximately 7,300 in 1994 to approximately 3,900 in 2001 as a result of the general developments within net fishing.

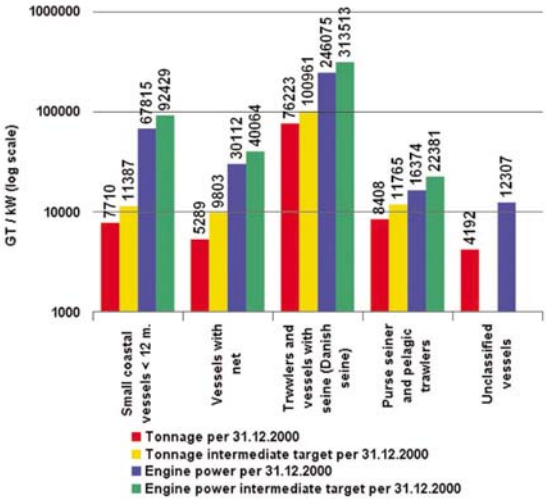
The monitoring carried out by the Danish Institute of Fisheries Sciences of by-catches of porpoise indicates that use of pingers (acoustic alarms) in the fisheries where by-catches typically occur is an efficient method for reducing by-catches. As yet, however, no definite conclusions can be arrived at concerning the effectiveness of pingers. This is partly because the relevant method of fishing (net fishing for cod near wrecks in the North Sea) has declined significantly during the observation period, and because it has not yet been possible to observe the long-term effect of pingers. The work on monitoring the effect of pingers and studies involving alternative equipment is planned to continue.

Indicator 9.3.4:

Capacity of the fishing fleet (tonnage, engine power, etc.) and composition in 2000

Source: The Danish Ministry of Food, Agriculture and Fisheries





This indicator elucidates developments in the adaptability of the size of the fleet to the catch possibilities. The figures show the composition of the fishing fleet as well as fleet capacity in gross tonnage (GT) and engine power (kW). The statistics are also presented by vessel category.

The capacity and development of the fishing fleet conforms to the targets agreed within the EU. The capacity of the fishing fleet was significantly reduced during the first half of the 1990s, which means that the total capacity is now approximately 20 per cent below the agreed ceiling; both in general terms and within each vessel category.

Seen in a wider perspective, the Government aims to continue adapting the capacity with a view to greater profitability and sustainability within the fishing fleet.

10. Forestry

Objectives

Forests and woodland areas should be used and managed in such a way as to allow them to play a part in fulfilling Denmark's nature, environmental, financial, and social needs, now and in the future. We should bolster the role of forests as one of society's welfare assets. Forests should provide opportunities for outdoor activities protect biodiversity and contribute to a varying landscape. Forests should produce wood products and help protect the environment, including protection of the groundwater and sequestration of CO_2.

Developments — a summary

The Danish forest areas are steadily growing larger, and during the period 1990 to 2000, the increase was relatively larger for deciduous woods than for conifers. Even though the forest area keeps growing larger, the present rate of increase is not sufficient to reach the objective concerning an increase in the forested area of Denmark so that forest landscapes cover 20–25 per cent of the Danish landscape in the course of one tree generation (80-100 years).

Parts of the public as well as the private forestry sector are currently working towards forestry according to near-nature principles. There is a particular wish to increase the area of deciduous forest. During the period 1990 to 1999, a total of approximately 70,000 hectares of forest were regenerated in Denmark. Of these, deciduous trees were used on almost 25,000 hectares, while conifers cover approximately 45,000 hectares. As deciduous trees account for less than half of the existing forest area, this entails an increase in the spread of deciduous trees.

Most areas in forests with special nature considerations are untouched forests or cut in accordance with the selection method, while grazing forest and coppice forest account for smaller areas. Woodlands aged 150 years or more account for approximately 8,400 hectares. No special requirements concerning forestry methods apply here, but greater biodiversity is likely in these areas. The objective in the Natural Forest Strategy stipulating that in 2000, at least 5,000 hectares should be designated as untouched forest or forest cut according to the selection method has been reached. This also applies to the objective stipulating that grazing forest, coppice forest, and other forest types should account for at least 4,000 hectares in 2000.

The number of visits made to Danish forests has risen from approximately 40 million a year in 1976/77 to approximately 50 million a year in 1993/94. This development is caused by an increase in the average number of visits to forests. The percentage of the population who visit the forests at least once a year remains unchanged at 91 per cent.

Perspectives for development of indicators

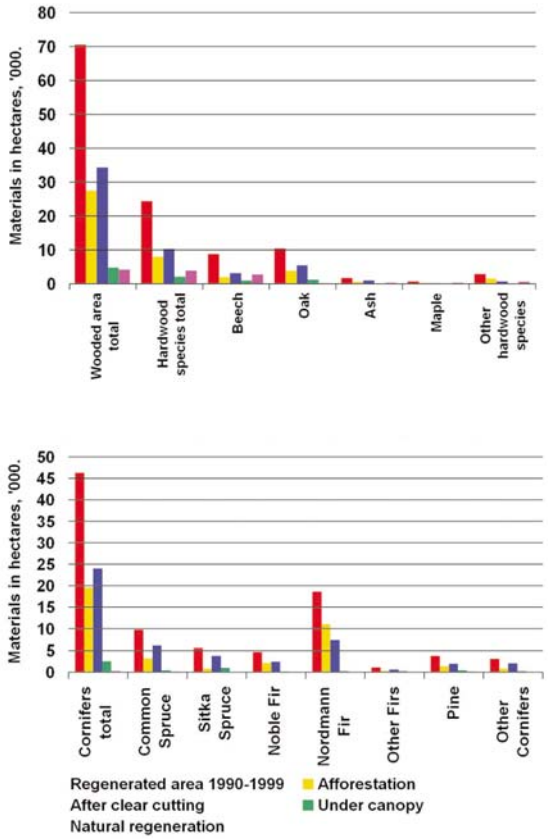
The indicators are based on the guidelines on sustainable forestry agreed upon by a broadly based working group in May 2001. The guidelines are partly based on near to nature forest management as a means for improving forest sustainability. The indicators are also based on the common European criteria and indicators for sustainable forestry which broadly define the significance of sustainable forestry. Data capable of elucidating the various aspects of near-natural forestry will become available when the new National Forest Inventory (NFI) is implemented in the years to come.

An indicator must be developed for the percentage of imported wood which has been environmentally certified in order to monitor consumption of imported wood and wooden products which have been legally forested and come from forests which are cultivated in a sustainable manner.

Indicator 10.1:

Forest regeneration and establishment methods. These include the proportion of regeneration material consisting of native tree species.

Source: The Danish Forest and Nature Agency, the Danish Forest and Landscape Research Institute, and Statistics Denmark.



This indicator elucidates developments pertaining to near to nature and environmentally friendly forest management. The figure shows the total regeneration of forest during the period 1990 to 1999, by species and regeneration method. The regeneration species have been analysed by two overall groups (deciduous trees and conifers) as well as by individual species within the two groups. The total regeneration area is divided into four regeneration methods: afforestation, after clear-cutting, under canopy, and natural regeneration. The method used for regeneration is a more accurate indicator for near- to nature forest management than the choice of species, as native species are not a precondition for near to nature forest management.

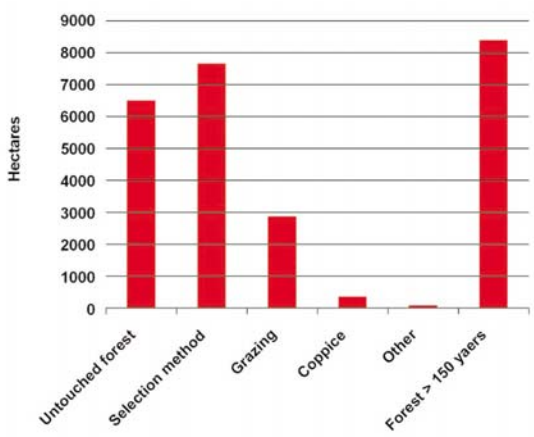
During the period 1990 to 1999, a total of approximately 70,000 hectares of forest were regenerated in Denmark. Of these, deciduous trees were used on almost 25,000 hectares, while conifers cover approximately 45,000 hectares. Beech and oak dominate the group of deciduous trees. Among conifers, Nordmann fir and noble fir are widely used. These species are typically grown for Christmas trees and decorative greens. Afforestation and regeneration after clear-cutting are the dominant methods of regeneration. When discounting establishment of Nordmann fir and noble fir, which is often carried out on farmland, deciduous woods account for approximately half the regenerated area. As deciduous trees account for less than half of the existing forest area, this entails an increase in the spread of deciduous trees.

Parts of the public as well as the private forestry sector are currently working towards forestry according to near-natural principles. This will probably lead to ever-more frequent use of the regeneration methods "under canopy" and "natural regeneration" in the years to come. There is a political desire to increase the area of deciduous forest in Denmark. This is evident in the form of subsidies for planting of deciduous trees in private forests and in the species policy applied to the areas owned by the Forest and Nature Agency.

Indicator 10.2:

Forests with special nature considerations

Source: The Danish Forest and Nature Agency, the Danish Forest and Landscape Research Institute, and Statistics Denmark.



This indicator elucidates developments pertaining to near-natural and environmentally friendly forestry. The figure shows the percentage of the Danish forest area reserved for a silvicultural system which pays special attention to biodiversity (untouched forest, selection-method forestry, grazing forest, coppice forest, and others). In addition to this, the figure also shows the amount of forest older than 150 years.

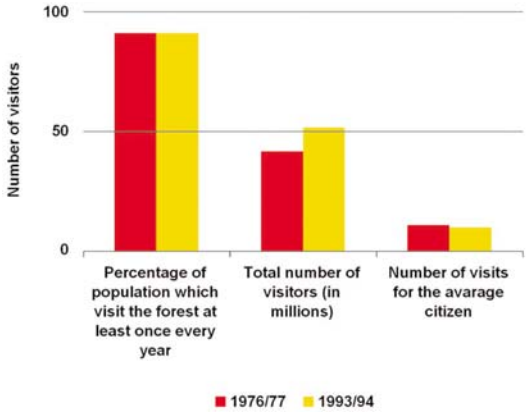
Most areas in forests with special nature considerations are untouched forest or cut in accordance with the selection method, while grazing forest and coppice forest account for smaller areas. Woodlands aged 150 years or more account for approximately 8,400 hectares. No special requirements concerning forestry method apply here, but greater biodiversity is likely in these areas.

The 1994 Natural Forest Strategy stipulated that in 2000, at least 5,000 hectares should be designated as untouched forest, whereas forest cut according to the selection method, grazing forest, coppice forest, and other forest types should account for at least 4,000 hectares in 2000. When we compare these figures with the graph, we see that the target has been met.

Indicator 10.3:

Number of visitors to forests

Source: The Danish Forest and Landscape Research Institute,



This indicator elucidates the trends regarding recreational use of Danish forests. The figure shows the number of visitors in Danish forests in 1976/77 and 1993/94. The data used for the survey have been collected in the form of representative interviews conducted over the course of one year. Both studies involved interviews with approximately 3,000 people.

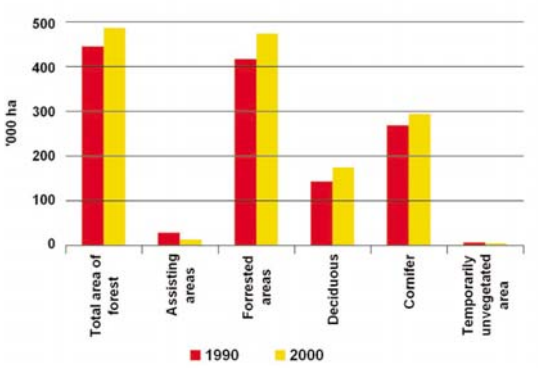
Based on these interviews, the number of visits made to Danish forests has been estimated at approximately 40 million a year in 1976/77 and approximately 50 million a year in 1993/94. This development is caused by an increase in the average number of visits to forests (more people making relatively many visits). At the same time, we see that the average citizen now makes 10 visits a year rather than 11. This is due to the fact that a relatively larger percentage of the population visits the forest a few times. The percentage of the population who visit the forests at least once a year remains unchanged at 91 per cent.

Increased recreational use of forests is assumed to promote welfare and health, which makes it a positive development as regards use of Danish forests.

Indicator 10.4:

Total forest area

Source: The Danish Forest and Nature Agency, the Danish Forest and Landscape Research Institute, and Statistics Denmark.



This indicator illustrates developments regarding the total forest area in Denmark during the period 1990 to 2000. In addition to this, it illustrates developments for assisting areas, forested areas, deciduous trees, conifers, and temporarily non-vegetated areas.

The Danish forest area grows ever larger. During the period 1990 to 2000, stocks of deciduous trees and conifers both grew. As will be clear from the figures, the increase for deciduous trees is relatively larger than for conifers. The extent of assistance areas has fallen, which is primarily the result of a new calculation method.

In 1989, the Danish Parliament decided that the Danish forest area must be doubled during a period of 80 to 100 years. As will be evident from the above, the Danish forest area is constantly growing. The rate of expansion is not, however, sufficiently high to successfully meet the objective of doubling the forest area within 80 to 100 years. As can be observed from the figures, the areas of deciduous woodland and conifer forest are both increasing, with the area of deciduous trees increasing relatively more than coniferous woodland.

11. Industry, trade and services

Objectives

Initiatives for a sustainable society and initiatives for future welfare must go hand in hand. Funding the welfare society of the future will require that private production grows and creates more wealth. Sustainable development requires that production and consumption is developed so that resource consumption is optimised and adverse environmental and health effects are reduced appreciably. We can achieve this by making it attractive to incorporate environmental considerations not only into company business procedures, but also into every link of the chain from production to consumption and disposal. Companies play a key role in bolstering the utilisation and development of environmentally friendly technologies.

Authorities, businesses and consumers have a common interest in working together to create a market where consideration of the environment is central for competition between enterprises, and for consumption of goods and services. Combined with new market-based instruments and voluntary initiatives, market forces will motivate the corporate sector and consumers to participate actively in this development. Regulations in the EU and in Denmark will continue to make up part of the foundation for enterprises' environmental initiatives.

Another objective of the Government is that Danish enterprises and investors should be able to easily document their environmental initiatives and that consumers are allowed easy access to information on environmental impacts from manufacturing processes.

Developments — a summary

The number of manufacturers applying for licences for their products has increased steadily from 1998 to 2000. The figures mainly comprise licences for the Swan (the Nordic eco-label), which was introduced in earnest in 1998. With few exceptions, the trends are positive for other product groups.

The increase in the number of eco-labelled products available shows that there is a market for environmentally friendly products. This also shows that the market can be used to support sustainable development. The increase in the number of eco-labelled products has been particularly pronounced in recent years, and in 2001, more than 2,350 eco-labelled products were widely available. The most commonly seen eco-label is the Swan label, but the Flower (the EU eco-label) is also making good progress. In 1999, only two products bore the Flower, and in 2000 the corresponding number was seven. In 2001, however, the number of Flower-labelled products increased to 54.

Environmental management is one way of integrating environmental concerns into production. In this manner, enterprises assume responsibility for ensuring a more environmentally friendly production chain. Since 1994, the number of enterprises with certified environmental management in the form of EMAS and ISO 14001 has increased year by year. Denmark is among the European countries which have the greatest number of EMAS registered enterprises compared to the size of the population (topped only by Austria). Developments in the number of EMAS and ISO registered enterprises show that it is possible to use environmental concerns as a competitive parameter.

Resource efficiency has improved. Following strong growth from 1995-96, energy consumption and drinking water consumption fell significantly up until 2000. During the period 1996 to 2000, there was a relative decoupling of energy and drinking water consumption from economic growth.

Since 1990, emissions of CO_2 and NO_X from industries have largely followed the rate of increase of the industries' gross value added (GVA). This development is primarily the result of the fact that increased activity within the industrial sector has entailed greater energy consumption. When comparing developments in CO_2 and NO_X emissions with the increase in GVA during the late 1990s, we see a trend towards relative decoupling as emissions become stabilised or decrease. By contrast, emissions of SO_2 remain almost constant up until 1995. After this time, there is an absolute decoupling of industrial growth from SO_2 emissions.

As regards tourism, eco-labelling promotes upgrading and improvement of tourist areas and the environmental standard of tourist facilities. From 1993 to 2000, there was an increase in the number of environmentally certified tourist enterprises, particularly within the Green Key scheme. After restructuring and new requirements were introduced, however, a decline has been observed. By contrast, participation in other labelling schemes, e.g. Destination 21, has gone up. The Blue Flag signals that beaches/marinas which fly it have made an extra effort to protect the environment. The number of Blue Flags has risen throughout a number of years. In the last couple of years, this increase has been particularly pronounced for beaches, whereas the level for marinas has remained relatively stable in recent years.

Perspectives for development of indicators

The objective is to carry out further development of the indicators within this area. Parts of this work are already being carried out within the various sectors of the area.

It would be relevant to develop specific indicators for the scope of sustainable investments in society; or more specifically for how the financial sector incorporates environmental concerns into their investments. This might initially involve the number of green ethical investment associations and the extent of green/ethical investments made within these associations. In the long term, it would also be desirable to have figures for the total sustainable investments in society.

In order to monitor developments as regards cleaner technologies and products and their extent, the opportunities for establishing an indicator for the market share of sustainable technologies will be addressed. The target is a continual reduction in the environmental impact from production enterprises. Therefore, work will be carried out to develop indicators for resource efficiency at various sectoral levels. In order to elucidate the extent of chemical use within the industrial sector, work is being carried out to develop an indicator for industrial consumption of chemicals.

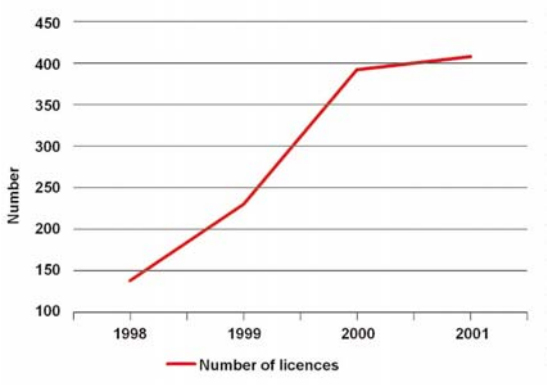
It may be relevant to investigate the opportunities for developing an indicator for the percentage of total consumption accounted for by eco-labelled products. This indicator may eventually replace the number of eco-labelled products.

The strategy emphasises the need for creating scope for new solutions, radical innovation, and new technologies. It may be expedient to consider the opportunities for elucidating Danish innovative competencies by means of an indicator, e.g. based on the European Innovation Scoreboard.

Indicator 11.1:

Number of licences for eco-labelled products

Source: Eco-labelling Denmark



This indicator elucidates developments in relation to the objective of creating an efficient green market. The figures provide an overview of the number of licences granted for Denmark's two official eco-labels, the Nordic Swan and the EU Flower. The figures do not indicate the total number of manufacturers with licences, as a single manufacturer may well hold licences for several products.

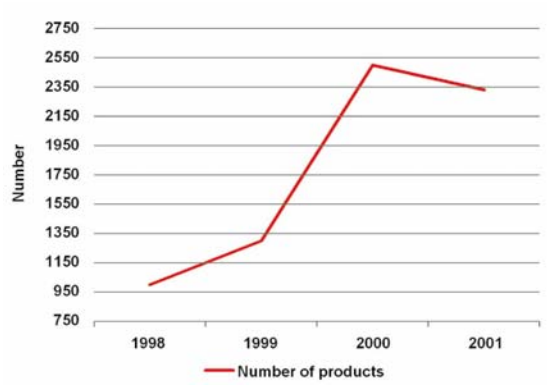
The number of manufacturers applying for licences for their products has increased steadily from 1998 to 2000. The figures mainly comprise licences for the Swan, which was introduced in earnest in 1998. The decrease in the number of licences from 2000 to 2001 is caused by a drop in the number of Swan licences for paper for printing, as the major manufacturers no longer thought it advantageous to keep their licence. The increase does, however, continue for other product groups.

The objective is to have as many products as possible eco-labelled in order to have the market support sustainable development. Apart from the reduction in Swan-label licences on paper for printing, trends are positive for the other product groups.

Indicator 11.2:

Number of eco-labelled products, analysed as the number of trade names

Source: Eco-labelling Denmark



This indicator provides insights into developments as regards the number of eco-labelled products on the market. The figures comprise Swan-labelled and Flower-labelled products. In relation to indicator 11.1, the figures show that a licence may involve several trade names (which are sold to different retailers). This is particularly true within the printed matter industry. Until the summer of 2001, it also applied to the paper product area.

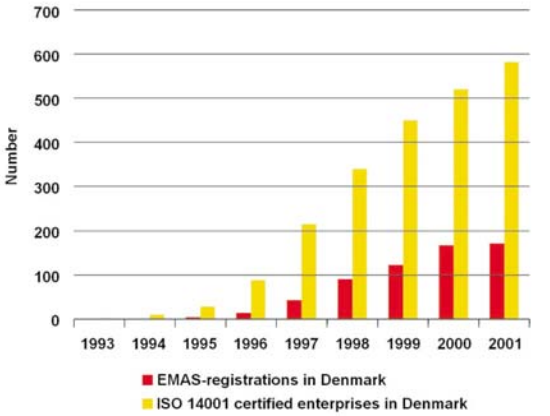
During the period 1998 to 2000, the number of widely available eco-labelled products has risen steadily. The most commonly seen eco-label is the Swan label, but the Flower is making good progress. In 1999, only two products bore the Flower, and in 2000 the corresponding number was seven. In 2001, however, the number of Flower-labelled products increased to 54. This increase coincides with the eco-labelling campaign initiated in 2001. The decrease in the number of product licences from 2000 to 2001 is caused by a drop in the number of Swan licences for paper for printing, as the major manufacturers no longer thought it advantageous to keep their licence. The increase does, however, continue for other product groups.

The objective is to have as many products as possible eco-labelled in order to have the market support sustainable development. Apart from the reduction in Swan-label licences on paper for printing, trends are positive for the other product groups.

Indicator 11.3:

Number of EMAS and ISO registered enterprises

Source: The Danish Environmental Protection Agency



This indicator has been chosen to elucidate developments in relation to the ability of enterprises to use their environmental efforts as a competitive parameter. The EMAS (Eco-Management and Audit Scheme) is the common European scheme for environmental management and environmental auditing. ISO 14001, which replaced BS 7750 in 1996, is the international standard for environmental management. The numbers in the figures are accumulated and show the number of EMAS registered and ISO 14001 certified enterprises in Denmark. Many EMAS registered enterprises are also ISO 14001 certified.

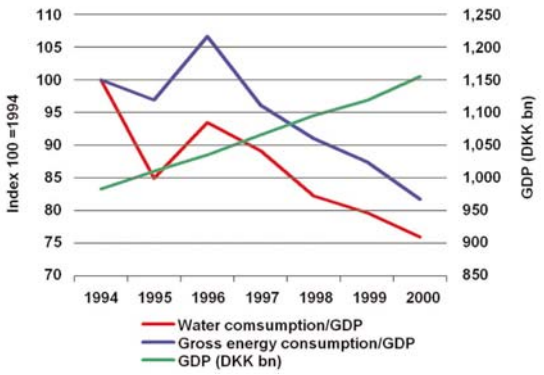
Since 1994, the number of enterprises using environmental management has gone up every year. One reason why the increase in the number of EMAS registered enterprises from 2000 to 2001 is smaller than before is that the method of analysis has been changed in connection with the adoption of the new EMAS Regulation in 2001. Denmark is among the European countries which have the greatest number of EMAS registered enterprises compared to the size of the population (topped only by Austria).

The objective is to ensure that enterprises can increasingly use their environmental efforts to give them a competitive edge. Positive developments in the number of EMAS and ISO registered enterprises contribute to reaching this objective.

Indicator 11.4:

Index for the manufacturing industry's resource efficiency for energy and water in relation to GDP

Source: The Danish Environmental Protection Agency



This indicator elucidates how growth and the environment increasingly go hand in hand. The figure shows the correlation between developments in energy consumption and water extraction, and economic growth.

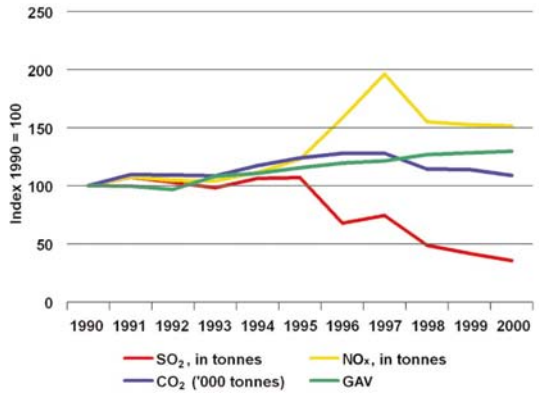
Resource efficiency has improved. Following strong growth from 1995-96, energy consumption and drinking water consumption fell significantly up until 2000. During the period 1996 to 2000, there was a relative decoupling of energy and drinking water consumption from economic growth.

During the period 1996 to 2000, there was a relative decoupling of energy consumption and water extraction from economic growth. This was particularly evident for water extraction.

Indicator 11.5:

Changes in industrial sector emissions of CO_2, NO_x, SO_2, and changes in GVA

Source: The National Environmental Research Institute, Denmark



This indicator illustrates developments as regards the objective on how growth and the environment should increasingly go hand in hand. Emissions of CO_2, SO_2 and NO_X primarily occur from the industrial sector's own energy plants. Emissions may, however, also occur in connection with production processes.

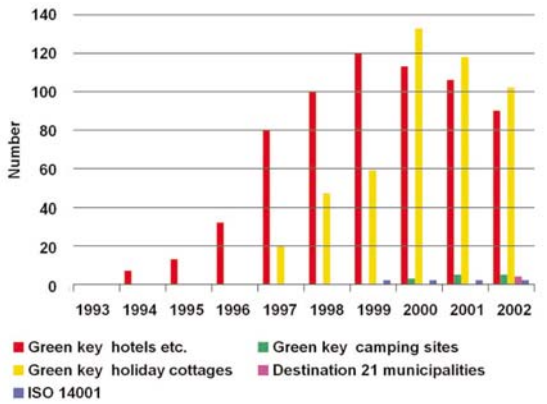
Since 1990, emissions of CO_2 and NO_X from industries have largely followed the rate of increase of the industries' gross value added (GVA). (The increase in NO_X indicated for 1995-97 is due to better methods of calculation). This development is primarily the result of the fact that increased activity within the industrial sector has entailed greater energy consumption. When comparing developments in CO_2 and NO_X emissions with the increase in GVA during the late 1990s, we see a trend towards a relative decoupling as the added value continues to grow while emissions of CO_2 and NO_X are stabilised or decrease. By contrast, emissions of SO_2 remain almost constant up until 1995 and then decrease significantly. Thus, there has been an absolute decoupling of economic growth in the industrial sector from SO_2 emissions. This development is due to requirements for less sulphurous fuels and introduction of flue-gas purifying plants. As of 1996, emissions have decreased markedly. This can be attributed to the introduction of a tax on sulphur in 1996.

Even though there is a trend for relative improvements in industrial emissions of CO_2 and NO_X in relation to production, economic growth and increased consumption will nevertheless necessitate constant development of products and technologies in order to reduce pollution, thereby ensuring a true decoupling of economic growth within the sector from environmental impacts.

Indicator 11.6:

Number of tourist enterprises that participate in eco-labelling schemes

Source: The Scientific Data Centre for Recreation and Tourism at the Danish Forest and Landscape Research Institute



This indicator illustrates developments as regards environmental initiatives within tourism in the form of participation in eco-labelling schemes Green Key, Destination 21, EMAS, the Flower, ISO 14001, and the Swan label.

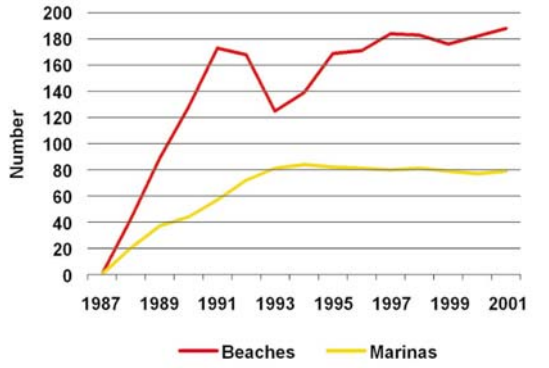
From 1993 to 2000, there was an increase in the number of environmentally certified tourist enterprises, particularly within the Green Key scheme. After restructuring and introduction of new requirements, however, a decline has been observed. By contrast, participation in other labelling schemes, e.g. Destination 21, has gone up.

Eco-labelling promotes upgrading and improvement of tourist areas and the environmental standard of tourist facilities. Therefore, the decline in participation in eco-labelling schemes is counterproductive.

Indicator 11.7:

Number of Blue Flag beaches and marinas

Source: Danish Outdoor Council (2002)



This indicator elucidates the objective concerning clean and safe bathing conditions. The number of "Blue Flag beaches and marinas" indicates how many beaches and marinas have been awarded the Blue Flag. The Blue Flag signals that the beach or marina which flies it has made an extra effort to protect the environment. In addition to this, a Blue Flag indicates that the relevant beach or marina is clean, has safety equipment, clean toilet facilities, waste facilities, etc.

The number of Blue Flags has increased again this year. In recent years, the increase has been most pronounced for beaches. This year, there are 12 more beaches with the Blue Flag than last year, while the number of "Blue Flag" marinas has remained unchanged. The reason for this development is a growing interest in making an extra effort to protect the environment, as well as the population's desire for a clean marine and coastal environment.

The objective is to work for a clean environment through information and an increase in the number of "Blue Flag" beaches and marinas in order to ensure recreational opportunities for tourists and local citizens. The objective is well on its way to being fulfilled.

12. Transport

Objectives

To achieve sustainable development in the field of transport, the Government intends to decouple growth in the impacts of transport on the environment and health from economic growth. Concern for health, safety and the environment must be integrated into transport policy. The Government's long-term benchmarks call for the transport sector to make its fair contribution to reducing national emissions of greenhouse gases and to ensuring that air pollution from traffic constitutes no health hazard to the population. Traffic noise must be reduced to a level which ensures that nobody is exposed to significant negative health impacts. Transport must be safe for everybody. The negative impact of the transport system on the natural habitats of animals and plants must be curbed.

The transport system must ensure that the population has access to work, shops, public services and leisure-time activities, and all citizens must be ensured efficient mobility through public and private transport solutions. Denmark must offer trade and industry excellent transport links to the surrounding world, and traffic congestion should only occur during peak periods. High traffic flow should be ensured for public and private transport, including cycle and pedestrian traffic.

Developments — a summary

Mobility is a main priority for the citizens of the Danish welfare society. This is evident from the close links between developments in gross national product and transport consumption. However, a faint but persistent relative decoupling of the increase in traffic from economic growth can be discerned.

During the period 1990 to 2000, the total passenger traffic performance has risen by almost 17 per cent, whereas freight transport (including airfreight) rose by 6 per cent during the period 1990 to 1999. As regards passenger transport, the most noticeable shift has occurred between bicycle and car traffic. By contrast, there has been an increase in total passenger transport by train in Denmark. As regards freight transport, there has been relatively strong growth in van transport. This makes for a higher strain on the environment per kilometre, as vans typically transport very few goods in relation to their capacity.

There is a clear tendency for the length of transport from home to work/places of education, from home to leisure activities, and from home to shopping facilities, etc. to become longer. This trend is more pronounced for shopping and leisure pursuits than for work. The figures for 2000 show pronounced increases for all purposes, but as this increase applies to one year only, it should be regarded with some caution.

In Danish towns and cities, traffic is the main source of air pollution. Despite mounting traffic, emissions of the pollutants SO_2, NO_X, NMVOC, and CO have fallen since the early 1990s. This decrease is expected to continue and intensify in the years to come. The transport sector accounts for a growing share of Denmark's total emissions of greenhouse gases (CO_2), which increased by 18 per cent during the decade 1990 to 2001. Transport emissions of CO_2 have largely followed the rate of economic growth.

When considering all forms of transport as a whole, no improvements in average energy efficiency have been observed during the period 1991 to 2001. This is to say that overall, new transport technology has not provided any decisive contribution towards meeting the strategy objectives concerning reductions in CO_2 emissions. Within the individual forms of transport, however, improvements in energy efficiency have been observed.

For the period 1990 to 1999, we see that capacity utilisation for lorry trips with solo wagons (lorries without attachment) has fallen for all weight categories. This development may partly be caused by an increase in loading capacity, and partly by a change in the type of freight transported.

Despite the fact that the weight of new cars continues to rise slightly, the average energy efficiency for new cars (total for petrol and diesel-powered cars alike) has gone up by 9 per cent from the second half of 1997 to the first half 2000. For new diesel cars, the increase during the period was 24 per cent, from 14.1 to 17.5 km/l. The development as regards average energy efficiency for new petrol cars was not nearly as positive: during the same period, the increase was only approximately 6 per cent, from 12.9 to 13.7 km/l. In order to reach the objective agreed by the European Commission and the European, Korean, and Japanese car industries regarding a maximum emission level of 140 g CO_2/km before 2008/2009, there is a need for a 6 per cent improvement for diesel cars and a 24 per cent improvement for petrol-powered cars.

The number of fatalities in traffic accidents is down by 19 per cent, and the number of serious and mild injuries fell by 12 per cent during the period from 1990 to 1999. This in spite of the fact that traffic performance increased by approximately 25 per cent during the same period. The decrease is particularly pronounced for the number of fatalities among cyclists and people driving mopeds, where the total number of deaths has been almost halved. Similarly, there has been a marked decrease (31 per cent) in the number of fatalities among pedestrians.

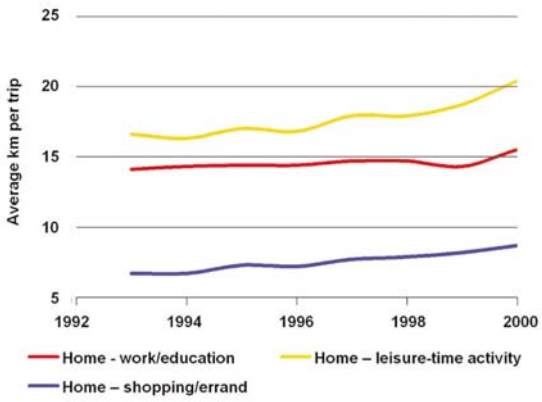
Perspectives for development of indicators

There may be a need for further development of the set of indicators within some of the central areas where objectives have been established, but where reliable data capable of describing developments within the area is not yet available. This applies e.g. to better methods for calculating the number of homes which are severely inconvenienced by traffic noise, as defined in relation to the EU noise directive and the future strategy for road noise. Another area concerns the opportunities for developing an indicator which elucidates the transport sector's impact on biodiversity and habitats (in the form of barrier effects). A third potential area would be elucidation of the relative distribution between means of transport and the length of trips. There may also be a need to develop an indicator for the national share of passenger traffic performance carried out by means of international connections, including airlines.

Indicator 12.1:

Average length of trip analysed by activity

Source: The Traffic Survey



This indicator elucidates developments in efficient mobility through public and private transport solutions. The figure illustrates distances from home to workplace/place of education, from home to leisure activities, and from home to shopping facilities, etc.

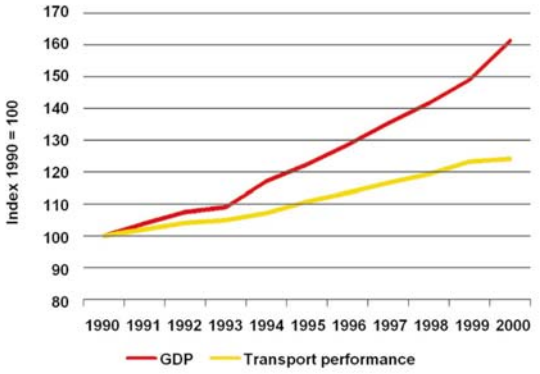
Based on these figures, we see a clear general trend for increasing transport distances. This trend is more pronounced for shopping and leisure pursuits than for work. The figures for 2000 show pronounced increases for all purposes, but as this increase applies to one year only, it should be regarded with some caution.

The target is that the transport system to ensure that the public has access to work, shops, public services, and leisure activities. Developments suggest, however, that the distances travelled for such access have grown longer.

Indicator 12.2:

Traffic performance/GDP

Source: Statistics Denmark



This indicator elucidates developments in traffic performance. The figure describes the indexed development in traffic performance on roads and railways, measured in million kilometres, as well as developments in GDP, at constant prices (1995 prices). Traffic performance is a measure of the amount of kilometres travelled by vehicles.

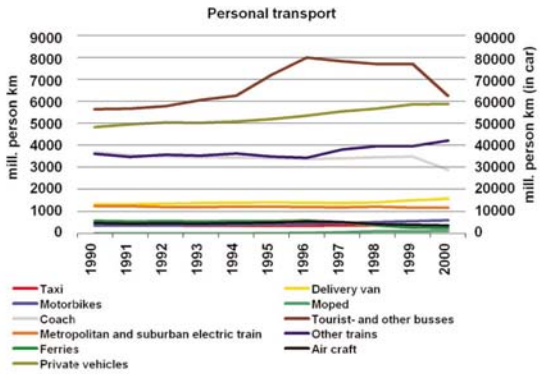
Mobility is a main priority for the citizens of the Danish welfare society. Among other things, this is evident from the close links between developments in gross national product and transport consumption. Thus, there is a correlation between economic growth and developments in traffic performance.

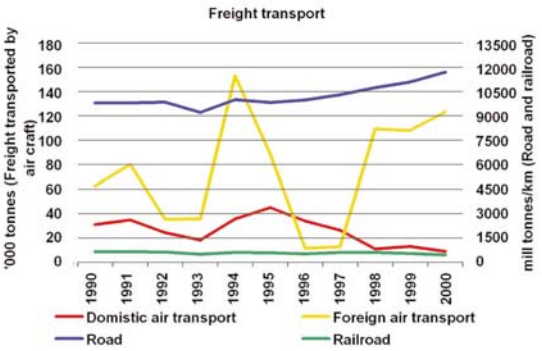
To achieve sustainable development in the field of transport, the Government intends to decouple growth in the impacts of transport on the environment and health from economic growth. This objective is also central for the EU's work on transport and the environment. A relative decoupling of the increase in traffic from economic growth can be discerned. This is due to lower rates of growth within traffic performance for goods and passenger transport than within the overall economy.

Indicator 12.3:

Passenger transport performance and freight transport performance analysed by means of transport

Source: Transport 2000; Statistics Denmark





This indicator elucidates the correlation between economic growth and greater negative impacts on health and the environment from transport. The distribution of passenger transport activities and freight transport activities (traffic performance) analysed by means of transport serves as an indicator for the relative environmental impact. Approximately 35 per cent of all CO_2 emissions from the transport sector come from freight transport.

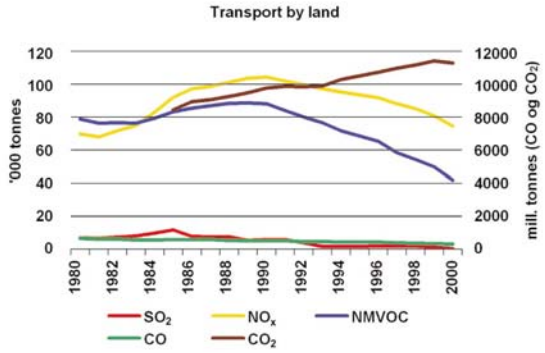
During the period 1990 to 2000, total passenger transport performance increased by almost 17 per cent. After 1996, there has been a relatively large increase in passenger transport by train. This increase is partly attributable to the opening of the bridge across the Great Belt. During the period 1990 to 1999, freight transport increased by 6 per cent. If ships and aircraft are left out of the calculations, the increase was 16 per cent. For ships and ferries, the period 1990 to 1999 is characterised by large fluctuations, with a strong decrease from 1997. The main explanation behind this decrease would be the opening of the bridge across the Great Belt. As ferries tend to consume more energy per unit transported than trains and passenger cars, the Great Belt bridge compensates amply for the increase in road transport caused by it. This is to say that a net reduction in CO_2 emissions from freight transport can be observed.

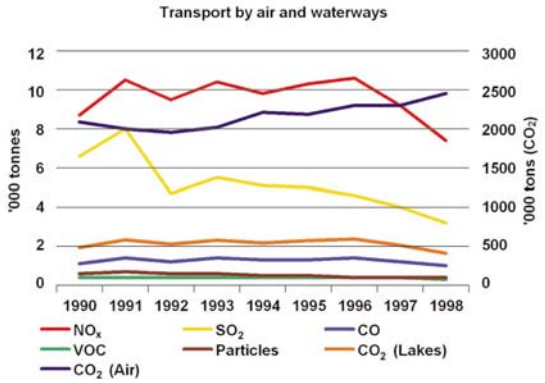
There has been an increase in the total passenger transport by train in Denmark. As regards freight transport, there has been a relatively strong growth in van transport. This makes for a higher strain on the environment per kilometre, as vans typically transport very few goods in relation to their capacity.

Indicator 12.4:

Transport emissions (CO_2, CO, PM10, NO_x, NMVOC and SO_2)

Source: The National Environmental Research Institute, Denmark





This indicator elucidates the environmental impact of transport, analysed by emission type. Pollutants from traffic are mainly nitrogen oxides (NO_X), volatile organic compounds (NMVOC), sulphur dioxide (SO_2), and particles and carbon monoxide (CO). In Danish towns and cities, traffic is the main source of air pollution. CO_2 emissions are primarily linked to the climate issue.

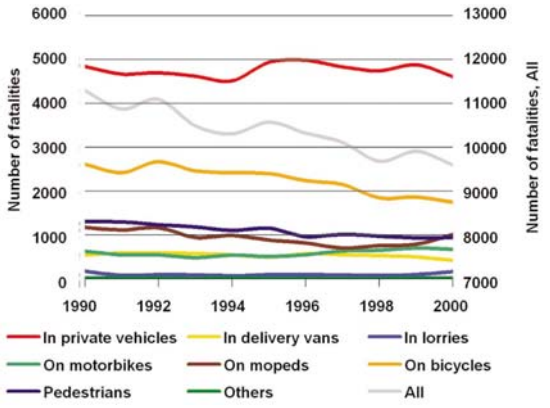
The transport sector accounts for approximately 27 per cent of Denmark's total emissions of greenhouse gases (CO_2). During the period 1990 to 2000, emissions from the transport sector increased by 15 per cent. In 1999, road transport accounted for 93 per cent of the total CO_2 emissions from the transport sector. Despite mounting traffic, emissions of NO_X, NMVOC, and CO have fallen. This is due partly to the 1990 requirement stipulating that new petrol-powered cars must have catalytic converters and partly to the introduction of cleaner fuels. During the period 1988 to 1998, the number of cars fitted with catalytic converters grew from zero to more than half of the total stock of cars. In general terms, it can be observed that air pollution from traffic has fallen since the early 1990s.

This reduction is primarily the result of the ever stricter norms established by the EU. As demonstrated by the figures for the various forms of transport, development towards lower emissions is slowest for those forms of transport (cargo vessels and aircraft) which are mainly regulated through international organisations.

Indicator 12.5:

Number of fatalities analysed by means of transport

Source: Transport 2000; Statistics Denmark



This indicator concerns the objective of safe transport for everyone. The figure shows the number of fatalities occasioned by the various means of transport, thereby serving as an indicator for their relative safety.

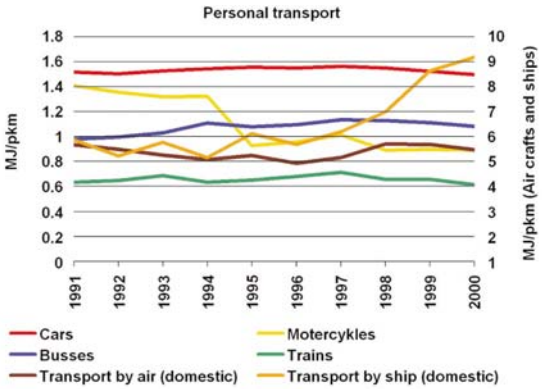
During the period from 1990 to 1999, the number of traffic fatalities fell by 19 per cent. The number of serious and mild injuries fell by 12 per cent during the same period. This in spite of the fact that traffic performance increased by approximately 25 per cent at the same time. From 1990 to 1999, the number of casualties among cyclists and people driving mopeds was almost halved, with reductions of 46 per cent and 45 per cent, respectively. Similarly, there has been a marked decrease (31 per cent) in the number of casualties among pedestrians. There has been small decrease (5 per cent) in the number of drivers killed, from 284 in 1990 to 271 in 1999.

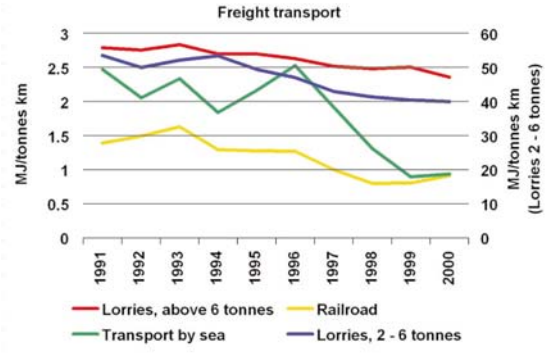
Developments are headed in the right direction as far as the objective on safe transport for everyone is concerned.

Indicator 12.6:

Average energy efficiency for passenger transport and freight transport

Source: The Danish Energy Authority's Odyssey Project





The development in average energy efficiency is an indicator of the negative environmental impact of transport. Transport performance includes kilometres covered by land, sea or air by the different types of transport. Better energy efficiency equals relatively smaller CO_2 emissions per kilometre.

In an analysis carried out by the Council for Sustainable Energy in 1998, it is estimated that energy efficiency for new passenger cars increased by 1.2 per cent on average per year during the period 1980 to 1990, whereas the increase during the period 1990 to 1997 has been close to zero. After the period of stagnation in the mid-1990s, however, energy efficiency has increased markedly from 1997 onwards. Lorries over six tonnes have shown a slight improvement in energy consumption per tonne kilometre of approximately one per cent annually during the last century. Smaller lorries, weighing between 2 and 6 tonnes, account for almost the entire growth in traffic performance for freight transport by road. This development contributes to increased CO_2 emissions from freight transport by road as smaller lorries have energy consumption per tonne kilometre which is more than eight times greater than that of larger lorries. However, it should be noted that this category of vehicle has also shown a decrease

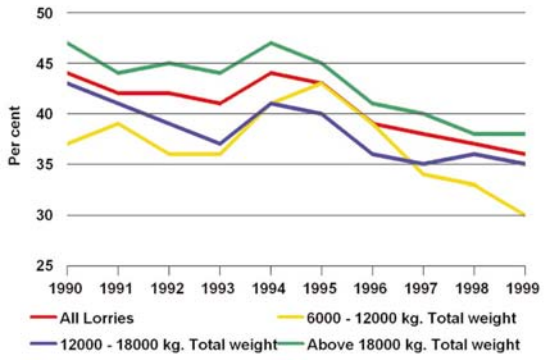
in additional consumption per tonne kilometre of about 20 per cent in this period. For goods trains, energy consumption has fallen when comparing 1999 consumption with 1980 levels. The reduction in energy consumption per tonne kilometre during the period 1991-1999 was approximately 33 per cent.

When considering all forms of transport as a whole, no noticeable improvements in average energy efficiency have been observed. This is to say that overall, new transport technology has not provided any decisive contribution towards meeting the Strategy objectives concerning reductions in CO_2 emissions. Within the individual forms of transport, however, improvements in energy efficiency have been observed.

Indicator 12.7:

Average capacity utilisation and average load for lorries over 6 tonnes

Source: Statistics Denmark



This indicator elucidates the objective concerning more environmentally friendly transport options. Capacity utilisation describes the relationship between the total transport activities and the transport activities (traffic performance) which would have been carried out if all lorries had been fully loaded on all trips. Despite the uncertainties involved in the calculations, capacity utilisation constitutes one among several important indicators for the development towards a decoupling of resource consumption within freight transport from the value created by the sector.

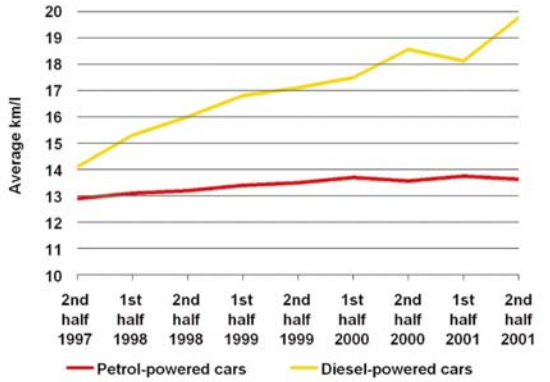
For the period 1990 to 1999, we see that capacity utilisation for lorry trips (without trailers) has fallen for all weight categories. This development may partly be caused by an increase in loading capacity, and partly by a change in the type of freight transported.

The development regarding capacity utilisation within freight transport with heavy vehicles does not contribute to meeting the Strategy objectives concerning access and the environment. The indicator does, however, point out great potential for improvements in efficiency.

Indicator 12.8:

Energy efficiency of new passenger cars

Source: The Danish Ministry of Transport



Energy efficiency is an indicator for resource consumption as well as for CO_2 emissions, as improvements in energy efficiency entail emissions of fewer grams of CO_2 per kilometre.

Despite the fact that the weight of passenger cars continues to rise slightly, the average energy efficiency for new cars (petrol and diesel-powered cars alike) has gone up by 9 per cent from the second half of 1997 to the first half 2000. For new diesel cars, the increase during the period was 24 per cent, from 14.1 km/l in the second half of 1997 to 17.5 km/l in the first half of 2000. Developments in average energy efficiency have not been nearly as positive for newly registered petrol-powered cars as for diesel-powered cars. During the second half of 1997, the average petrol consumption for new petrol-powered cars was 12.9 km/l. In the first half of 2000, the corresponding figure was 13.7 km/l, which equals an increase of slightly more than 6 per cent.

The European Commission and the European, Korean, and Japanese car industries have entered into an agreement regarding improvements of the average energy efficiency of new passenger cars, corresponding to an average emission level of 140 g CO_2/km before 2008/2009. In order to reach this objective with the present relative number of petrol-powered and diesel-powered cars, there is a need for a 6 per cent improvement for diesel cars and a 24 per cent improvement for petrol-powered cars before 2008/2009 in relation to current Danish levels. It should, however, be noted that the car industry has only committed itself in relation to the sales-weighted average, which means that the actual need for reductions will be somewhere between 6 and 24 per cent.

13. Energy

Objectives

Energy consumption and energy supply are paramount activity areas for achieving sustainable development. Therefore, anthropogenic climate change and SO_2 and NO_X emissions must be limited, but in a way that maintains balance in the economy. Therefore, there must be efforts for stable and cost-effective energy supply.

The Danish Government will liberalise the Danish electricity and gas markets in order to improve energy production efficiency, reduce energy prices, and ensure that energy is produced with less pressure on the environment. The Danish Government will also strive for more coordination in energy policy across borders, not least in the EU, so that the price of energy in individual countries reflects the actual cost, including the environmental cost. Denmark has entered into ambitious international obligations to reduce the negative impacts of energy on the environment. With its commitment to reducing emissions of six greenhouse gases by 21 per cent compared to 1990 levels between 2008-12, Denmark will make a significant contribution to the Kyoto Protocol and thus to countering global climate change. Furthermore, Denmark intends to reduce SO_2 emissions by about 30 per cent and NO_X emissions by about 45 per cent compared to 1998 levels by the end of 2010.

Developments — a summary

Gross energy consumption has remained relatively stable in the last ten years, whereas the composition of fuel consumption has changed radically. In 2000, the adjusted CO_2 emissions were 2.1 per cent lower than the year before, and compared to 1988 levels there has been a decrease of 11 per cent. Reducing CO_2 emissions is a main objective within Danish energy policy.

SO_2 emissions in Denmark have fallen in relation to gross energy consumption. The development has been pronounced: from SO_2 emissions of 452,000 tonnes in 1980 to approximately 55,000 tonnes in 1999 and approximately 28,000 tonnes in 2000. This reduction was primarily caused by use of fuels with lower sulphur contents, increasing use of desulphurisation plants, and increasing use of natural gas and renewable energy. NO_X emissions in relation to gross energy consumption have also decreased in the last 10 to 12 years. The reasons for this decrease include use of cars with catalytic converters and remediation systems at power plants, but increased use of natural gas and renewable energy also plays a part.

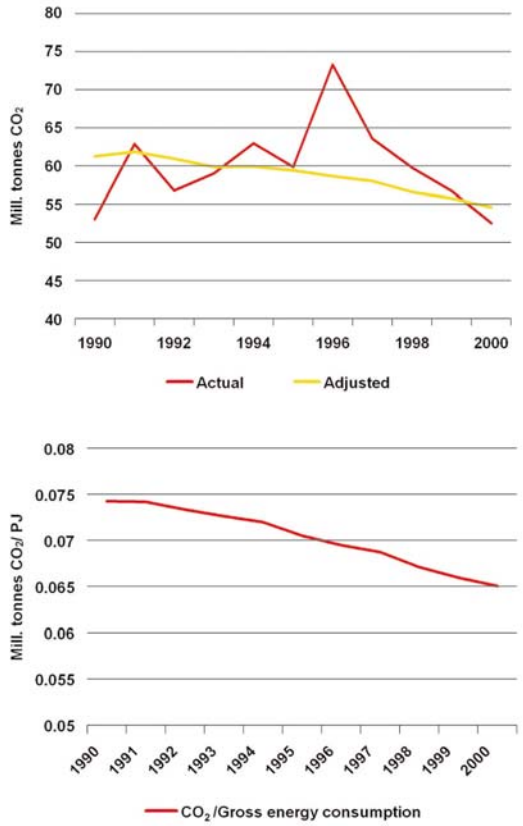
Energy intensity within production fell by 4.5 per cent from 1988 to 2000. Within agriculture and horticulture, energy intensity fell up until 1993, but has remained more or less unchanged since then. It is estimated that there is a potential for further energy savings.

Joint production of electricity and district heating has increased throughout the last 20 years. I 2000, more than 54 per cent of all domestic electricity supply came from combined heat and power plants. The corresponding share in 1990 was 29 per cent, while the 1980 figure was 19 per cent. In 2000, more than 80 per cent of all district heating was produced simultaneously with electricity. The corresponding figures in 1990 and 1980 were 60 and almost 40 per cent, respectively. This utilises the large amounts of heat generated in the course of traditional electricity production.

Indicator 13.1:

CO_2 emissions in million tonnes, actual and adjusted, and in relation to gross energy consumption

Source: The Danish Energy Authority, Energy Statistics 2000



This indicator illustrates trends as regard CO_2 emissions. CO_2 constitutes the main climate problem because of the enormous quantities accumulated in the atmosphere. The uppermost figure shows the actual and adjusted emissions. "Adjusted" means that account has been taken of variations which are dictated by the climate, as well as of variations caused by fluctuations in net exports of electricity. The bottom figure illustrates gross energy consumption.

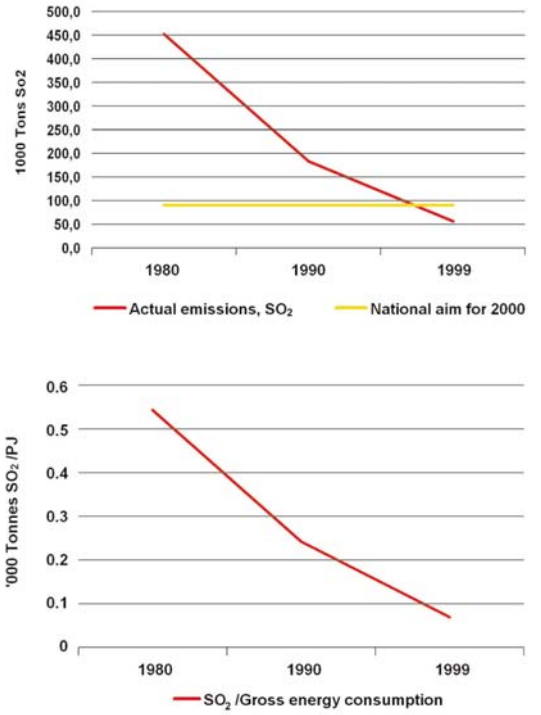
Gross energy consumption has remained relatively stable in the last ten years, whereas the composition of fuel consumption has changed radically. In 2000, the adjusted CO_2 emissions were 2.1 per cent lower than the year before. In relation to 1988, the reduction was 11 per cent.

Reducing CO_2 emissions is a main objective in Danish energy policy, and the national objective is a 20 per cent reduction in emissions from energy consumption during the period 1988 to 2005. Adjusted figures for CO_2 emissions are used to evaluate developments in relation to the national objective. In 2000, a reduction of 11 per cent had been achieved.

Indicator 13.2:

SO_2 emissions in million tonnes in actual figures and in relation to gross energy consumption in PJ

Source: The National Environmental Research Institute, Denmark



This indicator illustrates trends as regards SO_2 emissions. SO_2 is the main pollutant to be considered in relation to acidification, which is a major problem in e.g. Norway and Sweden (partly due to emissions transferred across national boundaries). By far the most important source of SO_2 emissions is combustion of fossil fuels, particularly combustion of oil and coal within the electricity generation sector.

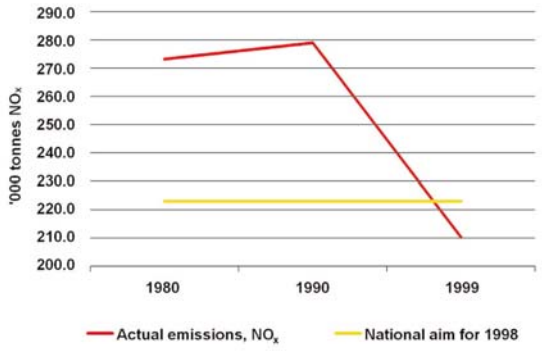
Emission reductions have been pronounced: from SO_2 emissions of 452,000 tonnes in 1980 to approximately 55,000 tonnes in 1999 and approximately 28,000 tonnes in 2000. This is primarily the result of the introduction of desulphurisation systems within the electricity and district heating sector, as well as of increasing use of natural gas and renewable energy. SO_2 emissions in Denmark have also fallen in relation to gross energy consumption. The reduction in relation to the gross energy consumption was primarily caused by the use of fuels with lower sulphur contents, increasing use of desulphurisation plants, and increasing use of natural gas and renewable energy.

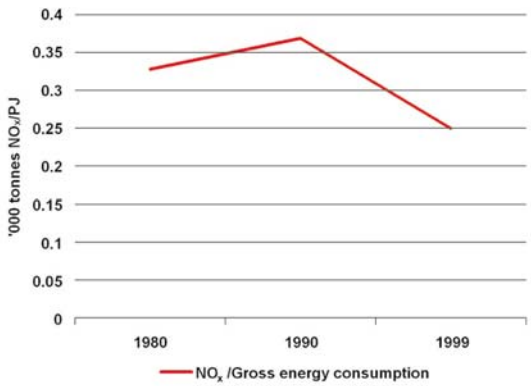
Denmark's international commitment in 2010 within the EU and the ECE is 55,000 tonnes. Within the UN (ECE), Denmark is committed to complying with the Sulphur Protocol, which means that SO_2 emissions should be reduced by 80 per cent from 1980 to 2000. This target was met in 1998. The new SO_2 objective under the auspices of the ECE is for Denmark to reduce SO_2 emissions by 70 per cent in 2010 in relation to 1990.

Indicator 13.3:

NO_x emissions in million tonnes in relation to gross energy consumption in PJ

Source: The National Environmental Research Institute, Denmark





This indicator illustrates trends as regards NO_X emissions. It is important to curb NO_X emissions, e.g. because of its ability to combine with VOC to produce ground-level ozone, which is a significant problem in large parts of Europe, both in relation to health and the environment.

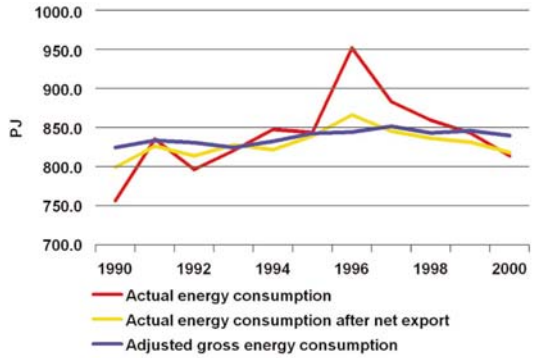
NO_X emissions in relation to gross energy consumption have decreased in the last 10 to 12 years. The reasons for this decrease include use of cars with catalytic converters and remediation systems at power plants, but increased use of natural gas and renewable energy also plays a part.

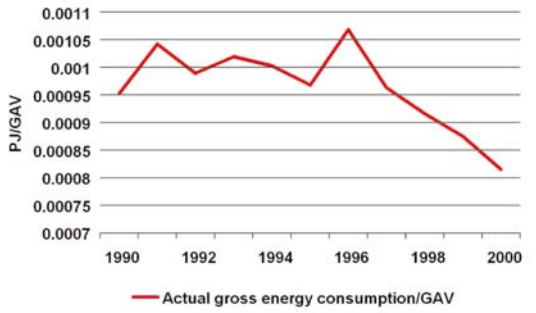
Denmark's international commitment in 2010 within the EU and the ECE is a reduction of 127,000 tonnes NO_X. It is expected that Denmark will be able to honour its commitment in the target year, 2010. The means employed to do so will be further use of catalytic converters on cars, further NO_X cleaning at power plants, and increased use of natural gas and renewable energy.

Indicator 13.4:

Gross energy consumption in PJ and final energy consumption in PJ

Source: The Danish Energy Authority





This indicator elucidates the total efforts made to reduce energy consumption. The actual energy consumption denotes registered energy consumption within a calendar year. The gross energy consumption (actual) is calculated by adjusting the annual energy consumption for fuel consumption associated with foreign trade in electricity. The adjusted gross energy consumption also includes corrections for climate variations in relation to a standard year. The objective is to arrive at a clearer picture of the trends regarding domestic energy consumption.

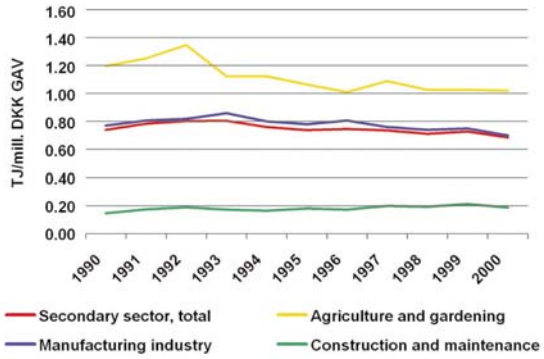
In 2000, the adjusted gross energy consumption was 843 PJ, and this figure has changed little since 1990. The actual gross energy consumption in 2000 was 813 PJ, which is 3.5 per cent less than in 1999. In relation to 1990, it is 7.5 per cent higher, a fact which should be considered in light of a considerable net import of electricity in 1990 compared to more modest imports in 2000.

The objective is to ensure a more consistent reduction in gross energy consumption.

Indicator 13.5:

Energy intensity for all production trades, and for agriculture and horticulture

Source: The Danish Energy Authority



This indicator elucidates the total efforts made to reduce energy consumption. The energy intensity has been calculated as energy consumption (adjusted for climate variations) in relation to gross value added (GVA) at constant 1995 prices.

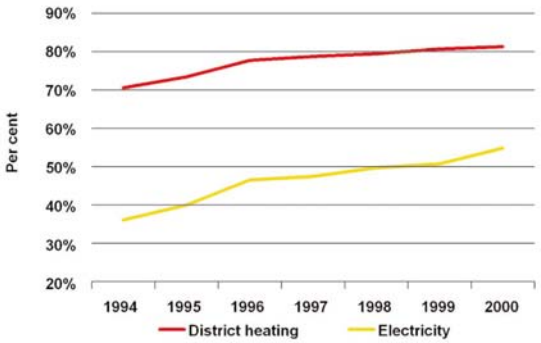
Energy intensity within production fell by 4.5 per cent from 1998 to 2000. The energy intensity rose by 12 per cent up until 1993, and subsequently fell. Energy intensity within manufacturing and building and construction has shown similar developments. Here, intensity rose by 12 per cent from 1988 to 1993, whereas it fell 19 per cent from 1993 to 2000. Within agriculture and horticulture, energy intensity fell up until 1993, but has remained more or less unchanged since then.

Despite the downward trend, there is still a need for better planning, coordination and prioritisation of the overall energy-saving initiatives.

Indicator 13.6:

Combined heat and power as a proportion of thermal electricity production

Source: The Danish Energy Authority



This indicator elucidates the total efforts made to reduce energy consumption. Danish energy policy places great emphasis on producing electricity and district heating as part of the same production process. This makes it possible to utilise the large amounts of heat generated in the course of traditional electricity production.

In 2000, more than 54 per cent of all domestic electricity supply came from electricity manufactured simultaneously with heating. The corresponding share in 1990 was 29 per cent, while the 1980 figure was 19 per cent. In 2000, more than 80 per cent of all district heating was produced simultaneously with electricity. The corresponding figures in 1990 and 1980 were 60 and almost 40 per cent, respectively.

The developments regarding the proportion of combined heat and power within thermal electricity production contributes to the overall objective on energy savings.

14. Urban and housing development

Objectives

The Government's primary objective is to promote sustainable development of towns, housing and buildings. Residents and users in individual urban and housing areas should participate actively in this development, for instance through a lifestyle that calls for everybody to consider the environment and limit resource consumption as much as possible in their everyday lives. Towns and cities must secure a framework for continued growth and they must provide attractive localisation for new businesses. With respect to social life, buildings and infrastructure, towns must be organised and managed with a view to significantly reducing resource consumption and environmental impacts. There must be greater productivity and efficiency in construction. Towns and cities must be alive and diverse, and they must be improved as a framework for good and equal integration of everyone in Danish society. The individual parts of towns and cities should offer housing, service trades, public institutions and culture, thus revitalising urban areas. The development of towns and cities must take place through private/public cooperation.

Older business districts and dock areas must be utilised better by renovating them for other uses. In this way, an attractive diversity in a town's supply of areas for business and housing is achieved. Urban transport functions should be organised so as to achieve the most effective utilisation of the overall transport system, and so that more can benefit from using public transport.

There must be a balance in the housing market, and individuals should have a real choice between renting and owning a dwelling. At the same time, new efforts will target depressed urban areas. Urban renewal creates a framework for the interplay between new and old, and it should emphasise quality, good architecture, and concern for the visual environment and urban ecology. Similarly, preservation-worthy historical environments must be safeguarded. We should also improve the quality of urban recreational opportunities.

Developments — a summary

Since 1974, an area the size of Bornholm has become designated as urban zone. Even so, urban zones account for a relatively modest percentage of Denmark's total area: 6 per cent in all.

The percentage of newly constructed business premises located close to stations in the Greater Copenhagen area has not increased in the last ten years. Approximately half of all new office businesses are still not being located near stations. This development continues to present challenges for integrated area and transport planning.

During the last ten years, the technical standard of the housing stock has improved significantly due to new construction work, modernisation, urban renewal, and demolition of the poorest dwellings. Since 1991, the number of dwellings with faulty or without installations/facilities has been reduced from 13 per cent to 8 per cent in 2001.

In the last ten years, approximately 8,500 rental dwellings have been completed each year. Of this number, private rented dwellings accounts for slightly more than 10 per cent. The Government wishes to see an increase in the supply of dwellings, e.g. by reinvigorating construction of private rented dwellings.

As regards heating of the housing stock, energy efficiency has been on the rise throughout the last ten years. Electricity consumption remained constant throughout the period. Energy consumption has remained relatively constant, even as the built-up areas have expanded by almost 8 per cent and the population has grown by 4 per cent. Water consumption within the household sector has displayed clear downward tendencies and is now low when compared to similar countries.

The extent of green areas available per capita varies greatly in the Danish towns and cities. A city like Aalborg has ten times more green areas per capita than Copenhagen. Close proximity to green areas continues to be an important element in connection with urban development.

Perspectives for development of indicators

It is an objective to ensure vibrant, diverse, high-quality urban areas with a varied supply of dwellings. Towns and cities must secure a framework for continued growth and they must provide attractive localisation opportunities for new businesses. There is a need to investigate the opportunities for developing indicators within this area.

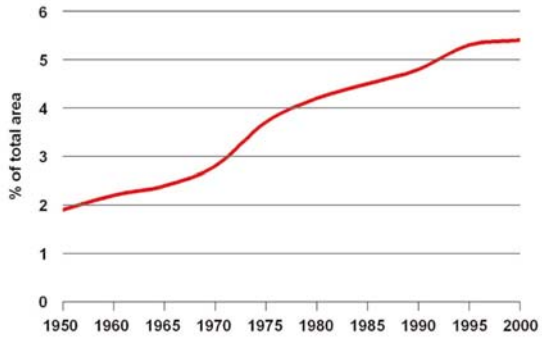
Indicators should be developed for social urban development which can illustrate development trends in socially disadvantaged urban/residential areas.

Following up on work carried out by the Committee for Commercial and Urban Policy, indicators for urban development and business issues will be developed. For some indicators, this can be extended with more nationwide data as these become available.

Indicator 14.1:

Area for urbanisation

Source: Nature and Environment – Selected Indicators, 2001



This indicator elucidates developments in land use for urban development. The figure illustrates urban development since 1950 as a percentage of Denmark's total area.

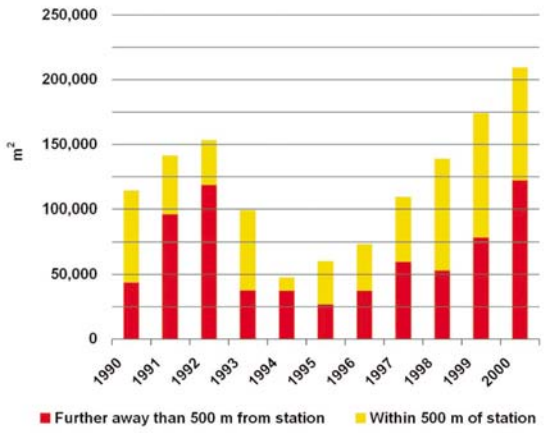
In the last 50 years, urban areas have tripled or quadrupled in size. Since 1974, an area the size of Bornholm has become designated as urban zone. Even so, urban zones account for a relatively modest percentage of Denmark's total area: 6 per cent all in all.

The growing urbanisation has entailed increased focus on local authority area planning with regard to a number of significant functions, e.g. use for dwellings, businesses, and service functions.

Indicator 14.2:

Proportion of recently built office facilities in the Greater Copenhagen Area which have been built within a distance of 500 metres from an S-train station

Source: The Danish Forest and Landscape Research Institute



This indicator illustrates the interplay between urban structures and the overall transport system. The figure demonstrates developments in the extent of recently constructed office facilities located near stations. Since 1989, the Greater Copenhagen area has aimed to have new buildings with office and service facilities located within a distance of no more than 1,000 metres from particularly well-serviced S-train stations or 500 metres from other, centrally located stations.

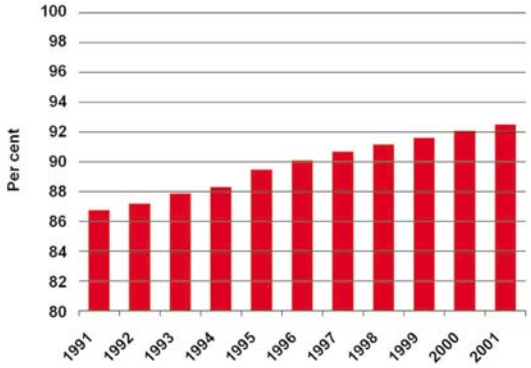
The curve shows that in spite of this objective, around half of all new office buildings are still being located in sites that are not close to stations. In fact, the trend in the late 1990s is for 80 per cent of such office facilities to be located far away from stations in the local authorities surrounding the main city of Copenhagen.

This development means that it is becoming increasingly difficult to contribute to ensuring that commuter traffic is carried out by means of public transport, thereby reducing car transport and dependence on cars. Ensuring integrated area and transport planning is a central objective in Copenhagen, but also in other major cities such as Stockholm and Amsterdam.

Indicator 14.3:

Proportion of all dwellings which have district heating, private bath/shower facilities, and toilet facilities

Source: Statistics Denmark



This indicator elucidates the quality and utility value of buildings. The number of dwellings without any installation shortcomings (i.e. dwellings which have district heating/central heating and in-house bath/shower and toilet facilities) constitutes 92 per cent of the total housing stock, which numbers 2.5 million dwellings. This means that dwellings with installation shortcomings account for 8 per cent of total housing stock. The most frequent shortage concerns bath facilities. A total of 6 per cent of all dwellings do not have their own bath or shower facilities, corresponding to 161,000 dwellings.

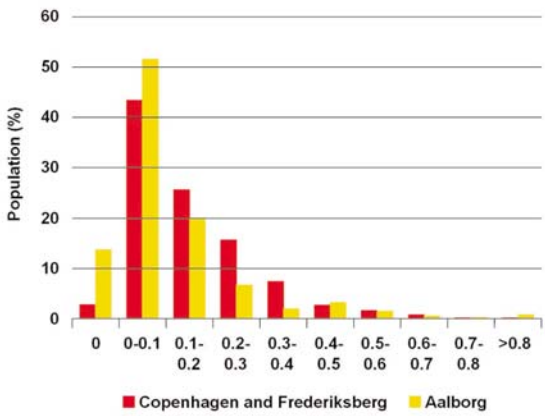
During the last ten years, the technical standard of the housing stock has improved significantly due to new construction work, modernisation, urban renewal, and demolition of the poorest dwellings. Since 1991, the number of dwellings with faulty or without installations/facilities has been reduced from 315,000 dwellings to 188,500 dwellings in 2001.

Compared to other countries, the technical standard of the Danish housing stock is very good – particularly because 98 per cent of the housing stock has proper heating supply.

Indicator 14.4:

Amount of green area (km²) accessible to the population in Aalborg and Copenhagen within a 15-minute walking distance

Source: The Danish Forest and Landscape Research Institute



This indicator elucidates the recreational opportunities offered by cities.

Having green areas within easy distance is important to recreation in everyday life. Studies show that if you do not have a green area within a distance of 500 metres from your home, you will not use it in the course of your everyday life.

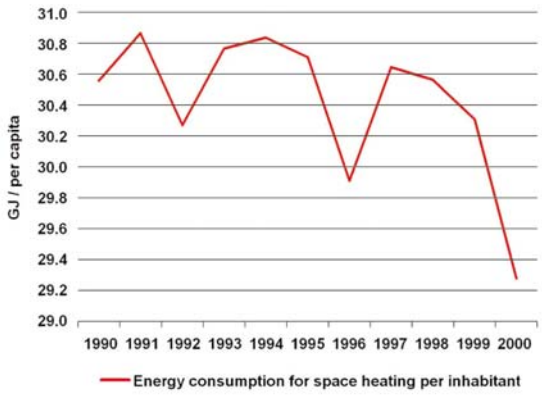
The extent of green areas available per capita varies greatly in the Danish towns and cities. A city like Aalborg has ten times more green areas per capita than Copenhagen. This is because Aalborg has large green areas on the outskirts of the city. Having said that, the figure also shows that the inhabitants of Copenhagen have access to more large green areas by percentage than is the case in Aalborg.

If the quality of urban recreation is to be improved, it is important to continue to ensure recreational opportunities in connection with urban renewal and development. Conversions of old commercial areas, urban renewal, etc., offer scope for improving green aspects of densely built-up urban areas.

Indicator 14.5:

Energy consumption for heating in the city as a whole

Source: The Danish Environmental Protection Agency and Statistics Denmark.



This indicator elucidates energy and resource consumption in dwellings. This figure illustrates energy consumption for heating (of rooms) and electricity per capita from 1990 onwards.

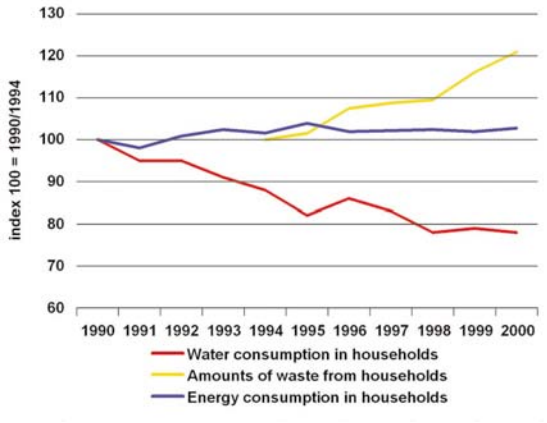
As can be observed, energy consumption has remained relatively constant throughout the ten-year period. During the same period, the built-up area increased by 7.8 per cent, while the population grew by 4 per cent. This means that there has been increased energy efficiency in connection with heating of the housing stock.

There is scope for more efficient energy use within dwellings.

Indicator 14.6:

Index for changes in electricity consumption, water consumption and waste volumes in dwellings/households

Source: The Danish Energy Authority and the Danish Environmental Protection Agency



This indicator elucidates resource consumption in dwellings. The figure shows indices for household water consumption from 1990 to 2000 and waste volumes 1994 to 2000 in thousand tonnes.

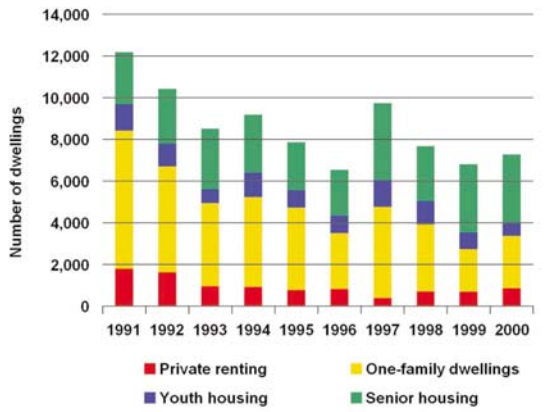
There has been a marked decrease in household drinking water consumption. Among other things, this should be seen in light of the fact that the 1993 tax reform included a water tax of DKK 1 per m^3 in 1994, which gradually grew to DKK 5 per m^3 in 1998. Denmark's water consumption per capita is low compared to other, similar countries. Cf. Vækstvilkår i Danmark from the Danish Ministry of Economic and Business Affairs, May 2002. As can be observed, energy consumption has remained relatively constant throughout a ten-year period. The waste volumes generated by households have increased steadily throughout the period. The increase amounted to 20 per cent, which exceeds the economic growth during the period.

Household water consumption has successfully been reduced, and electricity consumption has been stabilised despite increasing wealth. Waste volumes generated by households have, however, gone up.

Indicator 14.7:

Number of newly erected rented dwellings analysed by housing type

Source: The Danish Agency for Enterprise and Housing



This indicator elucidates the supply of housing. A total of 7,300 rental dwellings were built in 2000. Of these, 900 were private rental dwellings, while 6,400 dwellings were various types of publicly funded housing. In addition to this, 8,000 owner-occupied dwellings were built in 2000 (including cooperative dwellings).

In the last ten years, approximately 8,500 rental dwellings have been erected each year, with fluctuations in 1994, 1996, 1997, and 1999. Overall, there has been a decline in building activity within this area. Throughout the period, private rented dwellings accounted for slightly more than 10 per cent.

The objective is to secure growth in the supply of housing. The Government will ensure that construction of private rental dwellings resumes. Among other things, this will be done by providing pension funds with better opportunities for building and renting dwellings, including youth accommodation in university cities as well as dwellings for the elderly.

15. Measures and knowledge base

Objectives

A forward-looking commitment to the environment and sustainable development may stimulate competitiveness and the transition towards the knowledge economy. Paying attention to environmental concerns should be economically beneficial. This is why those who manufacture, supply, consume and finally dispose of products should bear the environmental costs. Technological breakthroughs and innovation are necessary to redirect society towards sustainable development. We need a solid knowledge base for making the right decisions and prioritising activities. Environment policy needs to be knowledge-based and build on the precautionary principle.

Developments — a summary

The percentage of legislative proposals which include descriptions of their environmental impacts has remained stable since the parliamentary session 1994/1995. During the period since 1993, there has been a decrease in the number of legislative proposals that have been passed without comments regarding their environmental impacts. The number of Bills with an active assessment of the environmental impacts of the proposal (either "with" or "without" comments) has increased to 90 per cent of all proposals.

There has been an increase in public-sector incorporation of environmental areas during the period 1997 to 2002. In 1997, a total of 47 ministries, agencies, and other state institutions provided information on environmental initiatives. In 2001, this figure has gone up to 199 out of a total of 350 state institutions.

There is an increasing public demand for leisure activities in nature. Nature guidance is one way of creating greater awareness of nature. The number of nature guides has risen from 128 in 1994 to 250 in 2001. These guides are either full-time employees or freelancers, and carry out approximately 21,000 activities a year for audiences numbering a total of 800,000 participants.

Within the education sector, the "Green Flag" campaign is an indicator for environmental teaching in schools. The number of Green Flags has increased significantly, from 19 in 1994 to 165 in 2002. There are other education schemes which focus on environmental awareness, but the "Green Flag – Green School" scheme is special because the entire school participates in the process of addressing a number of themes.

The period 1993 to 1998 saw relatively high growth in public as well as private investments in research and development. Investments have stagnated since then. Approximately one-third of total investments in research and development are made by the public sector, whereas private businesses account for the remaining two-thirds. In 1999, Danish investment in research and development corresponded to approximately 2 per cent of GDP. Denmark is committed to the EU objective stipulating that investments in research and development should account for at least 3 per cent of GDP before 2010.

Perspectives for development of indicators

There are plans to develop an indicator which illustrates the extent to which environmental taxes incorporate environmental costs in prices – or, in other words, the extent to which external costs are internalised. One option would be to base such an indicator on surveys of the socio-economic cost of the environmental impact of an emission/discharge which is subject to taxation or the cost of consumption of a taxed product. If the taxes per discharged unit are compared to the costs, the resulting ratio constitutes an index for internalisation. It may, for instance, appear that one particular tax corresponds to 102 per cent of the external costs, while another accounts for only 40 per cent. A total index for internalisation of external costs can then be constructed by weighting each individual index with the value of the total environmental impact associated with the relevant discharge/emission/consumption.

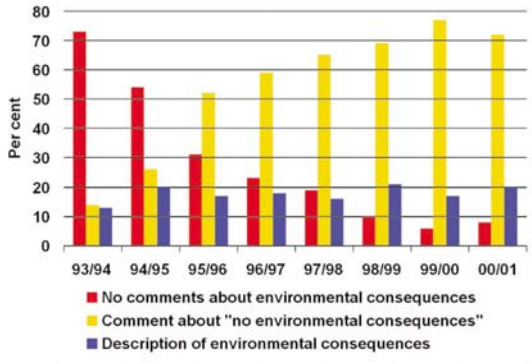
It would also be relevant to develop the indicator for research and development with a view to providing more details on how research and development supports sustainable development. This could be done by introducing subcategories addressing e.g. research on technological innovation and research related to environmental issues.

As a result of the Danish Ministry of Education's authorisation of an Agenda 21 for training in the Baltic region (Baltic 21E), work will continue on developing indicators for Baltic 21E: The forthcoming indicators will be based on the objectives and action plans outlined in Baltic 21E. This means that they will also be related to national proposals for indicators.

Indicator 15.1:

Environmental impact assessments of Bills

Source: Ministerial reports on environmental efforts in offices, agencies, and institutions.



This indicator concerns the objective stipulating that decisions at all levels should be assessed in relation to the environment. The figure provides an overview of the number of legislative proposals which include comments on environmental impacts.

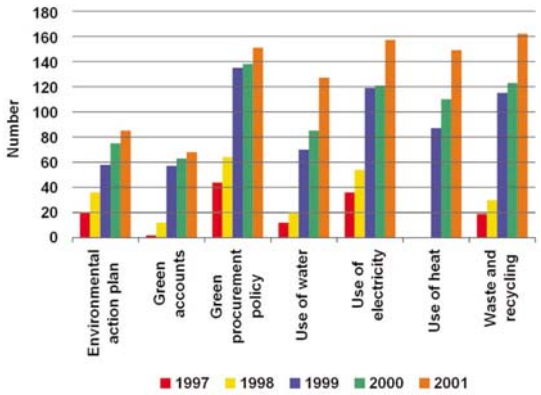
The percentage of legislative proposals that include descriptions of environmental consequences has remained stable since the parliamentary session 1994/1995. Thus, comments on environmental impacts were included in approximately 20 per cent of all proposals made during the parliamentary sessions from 1994/1995 to 2000/2001. During the period since 1993, there has been a decrease in the number of legislative proposals that have been passed without comments on their environmental impact. For the parliamentary session 2000/2001, it was 8 per cent. The relative share of legislative proposals that result in the comment "No environmental impacts" has gone up from 14 per cent during the parliamentary session 1993/1994 to 72 per cent during the parliamentary session 2000/2001.

The relative incidence of Bills with and without comments on environmental impacts seems to have become stabilised at a level where environmental impacts are assessed for more than 90 per cent of all legislative proposals.

Indicator 15.2:

Proportion of government institutions which have reported a green procurement policy

Source: Ministerial reports on environmental efforts in offices, agencies, and institutions.



This indicator serves to illustrate public sector inclusion of environmental considerations in their procurement policy. Management of day-to-day activities has an impact on the environment, e.g. via green procurement policies and management of consumption of energy, heat, and water. The data used comprises 47 state institutions in 1997, 69 state institutions in 1998, 165 state institutions in 1999, 166 state institutions in 2000 and 199 state institutions in 2001.

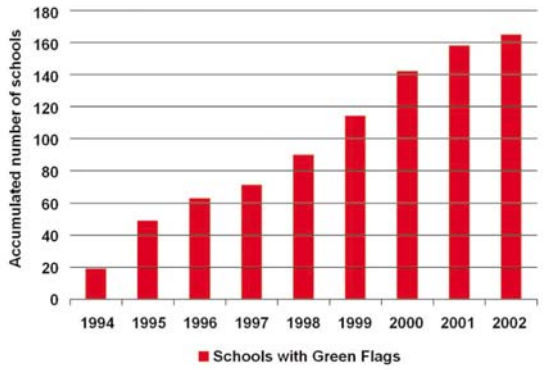
In 1997, a total of 47 ministries, agencies, and other state institutions reported environmental initiatives. In 2001, this figure had risen to 199 out of a total of 350 state institutions.

Incorporation of all environmental areas has increased from 2000 to 2001. As the number of state institutions included in calculations has increased in relation to last year, the increases regarding environmental efforts cannot, however, be ascribed to a general raising of priority given to this area by the institutions.

Indicator 15.3:

Number of schools with Green Flags

Source: The Danish Outdoor Council



The "Green Flag" campaign is an indicator for environmental teaching in schools. The figure illustrates developments in the number of "Green Flag" schools throughout the last nine years. A "Green Flag" school is a school which has carried out one or more Green Flag activities and which flies a Green Flag as a symbol of their green initiatives. The Green Flag themes are water, energy, waste, nature, and environmental auditing.

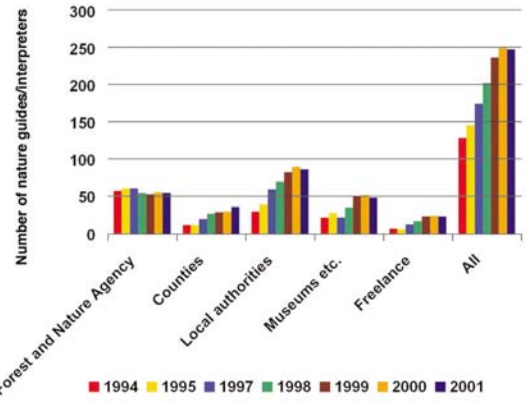
The graph shows a steady increase in the number of schools participating in the campaign (the 2002 figure was calculated as of 1 May 2002). The number of Green Flags has increased significantly from 19 in 1994 to 165 in 2002. It should be mentioned that not all schools will fly a green flag at any given time. Participating schools receive a flag for each theme completed, and are then allowed to fly the flag for a year. Once this year is up, the requirements associated with a new theme must be met. If these requirements are not successfully met, the flag is taken down. A new flag will be issued when the school meets the new requirements.

A steady increase in the number of schools interested in the campaign ties in well with the desire for including green aspects in teaching. Other education schemes also focus on environmental teaching, but the "Green Flag – Green School" scheme is unique in that the whole school takes part in the process. The scheme not only ensures raised levels of awareness and knowledge as well as behavioural changes in the school. It also affects real resource savings at participating schools. Continued increases in participation in the "Green Flag" scheme would be most satisfactory.

Indicator 15.4:

Number of nature guides/interpreters

Source: The Danish Forest and Nature Agency



This indicator elucidates dissemination of knowledge about sustainable development. Nature guides/interpreters are individuals who carry out activities in nature with a view to creating greater awareness of nature. The nature guides are associated with the Nature Guide Scheme, a network scheme that comprises nature guides employed by central and local authorities and organisations. The nature guides work on the basis of common goals and have all completed special training on how to communicate nature issues.

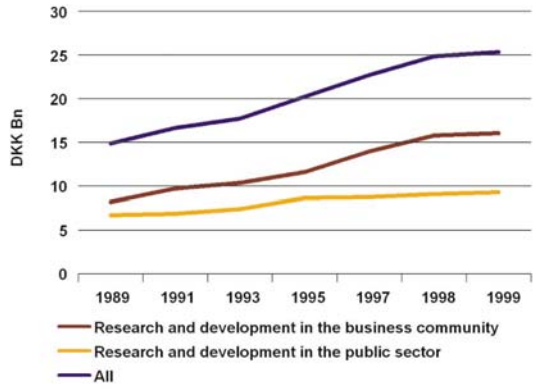
There is an increasing demand for leisure activities in nature. At the same time, there is growing awareness of the fact that nature guidance is a good way of promoting appreciation of nature. The number of nature guides has risen steadily, from 128 in 1994 to 250 in 2001. Nature guides carry out approximately 21,000 activities a year for a total of approximately 800,000 participants.

Nature Guidance facilitates greater appreciation of nature and better awareness of environmental issues. Consequently, Nature Guidance constitutes an important instrument as regards the efforts made to achieve sustainable development. The aim is to develop nature activities which promote understanding for sustainable development. The nature guides are specifically trained to participate in this process.

Indicator 15.5:

Total funds for research and development

Source: The Danish Institute for Studies in Research and Research Policy



This indicator elucidates developments in the knowledge base. The figure shows the total Danish investments in research and development for the period 1989 to 1999. No data is available for the period after 1999. Calculations are carried out at constant 1999 prices.

The period 1993 to 1998 saw relatively high growth in public as well as private investments in research and development. The level of investment has stagnated since then. In 1999, Danish investments in research and development corresponded to approximately 2 per cent of GDP. This figure was slightly below the 1990 objective stipulating that Denmark should conform to the OECD average, which was 2.23 per cent in 1999. Approximately one-third of the total investments in research and development are made by the public sector, whereas private business accounts for the remaining two-thirds. Investment levels have increased more rapidly within the business sector than within the public sector. The ratio between public and private sector investments will soon be 1:4, unless public-sector investments increase significantly in the years to come.

Investments in research and development are traditionally considered to provide better opportunities for economic growth. They also bolster a country's potential for achieving its specific objectives, including environmental objectives. Denmark is committed to the EU objective stipulating that investments in research and development should account for at least 3 per cent of GDP before 2010. According to the Research Commission's report from 2001, this entails that Denmark's total investments in research and development should be increased from the approximately DKK 25 billion invested in 1999 to DKK 45 billion in 2010.

16. Public participation and Local Agenda 21

A sustainable society is based on democracy and openness and relies on popular participation and responsibility for decisions. Sustainable development can only be realised if all parts of Danish society are committed to working towards this goal. One of the messages in the Brundtland Report of 1987 and the Rio Declaration of 1992 was that active public participation is a prerequisite for achieving sustainable development and solving the environmental problems of the world. Denmark has a long tradition of involving the public. In the environment field, this tradition was followed up by an international agreement – the so-called Aarhus Convention of 1998. The work towards sustainable development depends on the population having easy access to information; being able to participate in decision-making processes; and having access to launch complaints on environmental matters.

If we are to achieve sustainable development globally, the principles of the Aarhus Convention should also apply in other countries. Denmark will work to ensure that these principles are employed more extensively in international agreements, and that initiatives to strengthen public access to information and participation are included in the results of the World Summit on Sustainable Development in 2002. Local Agenda 21 activities also play an important part in the efforts to realise sustainable development.

Developments — a summary

There has been an increase in the number of counties and local authorities working with Local Agenda 21, even though growth has been waning. Local Agenda 21 is characterised by the fact that activities aimed at sustainable development are carried out in accordance with local conditions and opportunities, often on a project basis. Counties and local authorities increasingly provide funding for citizen's initiatives in connection with Local Agenda 21.

Perspectives for development of indicators

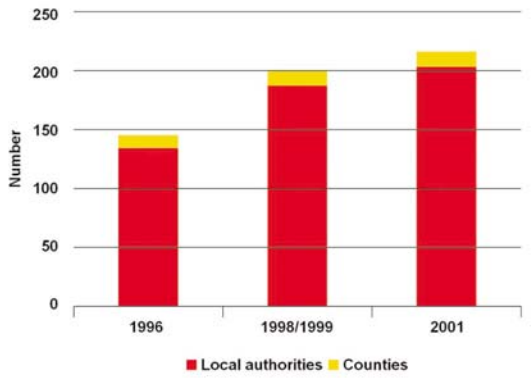
Public participation is a central aspect of the work undertaken to promote sustainable development. This means that there is a need for establishing more specific indicators which describe how individual citizens participate in the efforts while also elucidating the more formally organised work carried out within Local Agenda 21 activities.

As regards formally organised local work, one possible indicator might address the number of public meetings or other activities which promote Local Agenda 21 activities. Examples of indicators which link formally organised work and the general public might be data that elucidate whether local or county authorities have initiated Local Agenda 21activities at the initiative of private citizens, or which looks at the extent to which groups outside of the local or county authorities' own organisations take part in Local Agenda 21 activities. At present, this data is calculated every second year.

Indicator 16.1:

Number of counties and local authorities which have started working with Local Agenda 21

Source: The Ministry of the Environment, the Spatial Planning Department



This indicator elucidates developments in Local Agenda 21 activities. Local Agenda 21 is characterised by the fact that activities aimed at sustainable development are carried out in accordance with local conditions and opportunities. This means that no single definition exists. The work is, however, characterised by a holistic approach, cross-sectoral thinking, public participation, awareness of (life)cycles and global considerations, and long-term perspectives.

Compared to the developments in participation from 1996 to 1998, the period 1998 to 2001 still showed increases. Growth has, however, been lower in recent years.

There has been an increase in the number of counties and local authorities working with Local Agenda 21, and Local Agenda 21 activities are becoming ever more widespread and firmly anchored. This is apparent both in relation to the width of activities performed and the number of stakeholders involved. At the same time, counties and local authorities increasingly provide economic support for citizen's initiatives in connection with Local Agenda 21.

17. Where can you read more about indicators for sustainable development?

- The Ministry of the Environment (2001): Natur og Miljø 2001 – Udvalgte indikatorer (in Danish only) http://www.sns.dk/publikat/netpub/indikator2001/index.html

- The National Environmental Research Institute, Denmark (2001): Natur og Miljø 2001 – Påvirkninger og tilstand (in Danish only). Report No. 385 from The National Environmental Research Institute, Denmark: http://www.dmu.dk/1_viden/2_Miljoe-tilstand/3_samfund/tilstandsrapport_2001/rapport/NM2001_0.pdf

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- Report from the Commission on the strategy for environmental sustainable development (2000): Indikatorer i fremtidig strategi for miljømæssig bæredygtig udvikling – metodemæssige overvejelser og eksempler (in Danish only). http://www.mst.dk/tv%C3%A6r/6%C3%A6redygtighed/Analyser/4%20Indikatorer%20i%20fremtidig%20strategi%20for%20milj%C3%B8m%C3%A6ssig.doc

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