

21EN

Mika Toikka (ed.)

Eco-efficiency indicators for the Kymenlaakso Region

STATUS

DEVELOPMENT



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Cover picture: Traffic lights for measuring eco-efficiency indicator categories / Mika Toikka

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Foreword

In 2005, the Southeast Finland Regional Environment Centre conducted a project financed by the Ministry of the Environment, entitled “Measuring Regional eco-efficiency–indicator-based monitoring.” The regional environment centre has been partnered with the Regional Council of Kymenlaakso, Employment and Economic Development Centre for Southeast Finland (TE Centre) and the Regional Road Administration of Southeast Finland.

The work has been supervised by a steering group chaired by Leena Gunnar from the Southeast Finland Regional Environment Centre, the other members including Tapio Välinoro, Executive Director of the Regional Council of Kymenlaakso; Jarmo Pirhonen, Director of the TE Centre for Southeast Finland; and Antti Rinta-Porkkunen, Director of the Regional Road Administration of Southeast Finland. The specialist group established for the project was chaired by the responsible project director, Juha Pesari, Chief Engineer at the Southeast Finland Regional Environment Centre. Mika Toikka, Senior Researcher, from the Southeast Finland Regional Environment Centre acted as chief project researcher. The remaining two specialist group representatives were Niilo Melolinna, Special Researcher, from the TE Centre for Southeast Finland, and Hanna Kailasto, Environmental Expert, from the Regional Road Administration of Southeast Finland.

The project was related to the ECOREG project carried out by the Finnish Environment Institute in 2002–2004: the objective of the present project was to create a model for updating indicator data as well as to further develop the ECOREG system. Opinions and proposals regarding indicator-based monitoring were discussed among both the specialist group and the steering group. Furthermore, a seminar-type extended workshop for the steering and specialist group combined was arranged during the project, giving key people from all organisations involved the opportunity to present their views on the project. Some of the development proposals have already been taken into account, but views expressed during follow-up work have an even greater role in developing the system into a further improved tool for regional decision-making.

This report provides a detailed overview of the practical process of updating the regional eco-efficiency monitoring and evaluation system generated by ECOGREG, in addition to presenting the latest updated statistics included in the system.

Financial assistance for this project has been received from the Ministry of the Environment, which has been of key importance in facilitating the work.

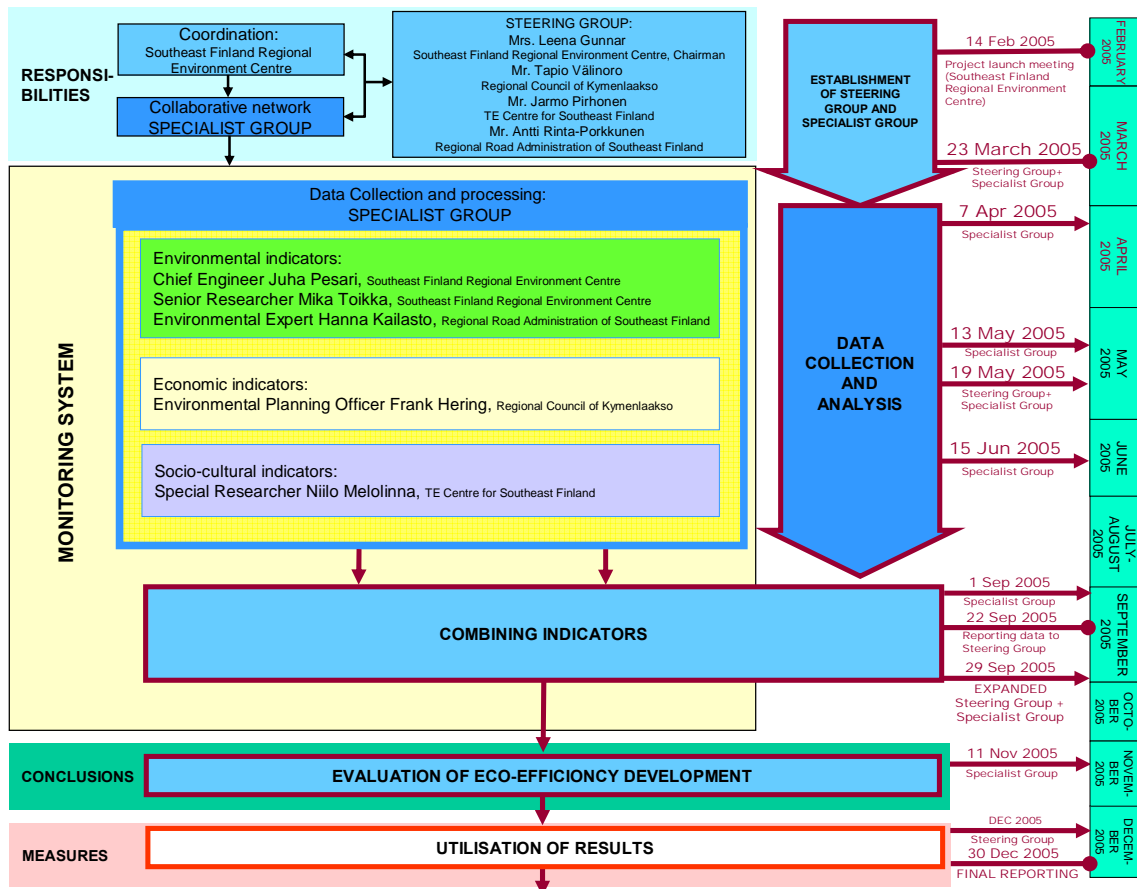
Juha Pesari, Chief Engineer
Project Director

Introduction

The project “Measuring Regional eco-efficiency—indicator-based monitoring” was a continuation of the ECOREG project carried out in 2002–2004. During 2005, a practical action environment for monitoring eco-efficiency along with related organizations and procedures has been created for the Kymenlaakso region.

This publication is the first annual report on the eco-efficiency indicators of Kymenlaakso, and it entails the latest available annual data updates for the indicators selected. In addition, the report includes summaries by indicator category and evaluations for all indicators individually, as well as a general assessment on the development of eco-efficiency. The development trends (**absolute development**) have been illustrated by indicator category and individual indicator with the so-called ‘traffic lights model’, in which the colour of the light has been determined according to expert evaluations. The traffic lights meter on the cover of this publication indicates the evaluated development of each indicator category, with the hand of the meter pointing at the arithmetic mean of the individual indicator ‘traffic lights’ included in each category. With reference to the socio-cultural and economic indicators, traffic lights have also been determined for indicator status (**current status compared to national level**) and for **development compared to national level** (Annexes 56–58).

The diagram below demonstrates the composition and implementation schedule of the project in 2005.



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1 Eco-efficiency indicators

1.1 Environmental indicators

Twenty-seven environmental indicators have been selected for annual monitoring in the eco-efficiency monitoring and evaluation system for the Kymenlaakso region. The indicators describe developments in emissions into the air, local air quality, wastewater releases, groundwater quality, traffic, oil and chemical accidents as well as biodiversity, the use of natural resources and energy consumption.

With regard to carbon dioxide, nitrogen oxides and sulphur dioxide, the situation concerning emissions into the air from industry and energy production mostly indicates positive development. The indicators describing other emissions into the air show a more level development (according to the evaluation methods currently available). The indicators describing local air quality also point towards improvement, measured in both odorous gases and small particulates at selected monitoring stations. For dioxins and furans, a more accurate estimate will be completed by the end of the year.

Nitrogen loads to waters from industry and communities (exiting treatment plants) have shown a clear growth trend since the turn of the century. For industry, growth in production has played a role in increasing wastewater releases, and the principal reason for the rise in loads from communities is the increase in households connected to the sewer system. A clear decrease has been observed in nitrate nitrogen concentrations at the monitoring stations which measure groundwater quality (in Elimäki and Valkeala), whereas chloride concentrations caused mainly by road salting are on the rise.

Large-scale industry, ports, terminals and other logistics services represent a substantial addition in the heavy traffic within Kymenlaakso region. The heavy traffic constituted by exports and imports travelling by land between Finland and Russia as well as the Russian transit traffic are constantly growing, introducing another addition to the regions' traffic and, therefore, emission loads. For these reasons, traffic-induced carbon dioxide and nitrogen oxide emissions are increasing.

The constant growth in industrial production and traffic contracting in the region enhances the risk of accidents. According to the statistics used, an increase can be detected both in the number of oil and chemical accidents occurring in the region and in the loads generated by such accidents.

The eco-efficiency of consumption behaviour is described by waste management indicators, which have been used to demonstrate the effectiveness of a community's efforts in recovering waste materials. According to the calculation method used, the recovery rate seems to be developing in an unfavourable direction. However, a more accurate result for this indicator requires revisions in both waste-related statistics and reporting.

The development in the consumption of electricity has been steady: the proportion of industry in the overall consumption is also emphasised with regard to this indicator, having remained at a level of more than 80% throughout the period of investigation. This is naturally evident in the self-sufficiency rate of energy production as well, which in 2004 climbed back up to the level of before the downswing in 2000.

1.2 Economic indicators

Based on the analyses conducted in connection with the ECOREG project, economic indicators essential to the Kymenlaakso region have been selected. These indicators describe economic growth and the financial welfare of the population. Some indicators describe regional development over time, whereas others are designed for comparisons between regions.

The special characteristics of the Kymenlaakso economy should be taken into account in interpreting indicator data. Industry and traffic have established a strong position in the industrial structure of Kymenlaakso. The region's economy relies heavily on forestry and related metal industry as well as on the intensively growing field of logistics. However, Kymenlaakso still remains a shadow zone when it comes to the most rapidly growing fields of production, namely information technology and the electronics industry at large.

Due to the bulk of the forestry cluster, the share of industrial production in the regional economy is significantly larger than the national average. The proportion of the paper industry in the number of jobs within the region is nearly six-fold and that of traffic-related operations nearly three-fold, compared to corresponding figures for all of Finland.

The rapid economic growth of Russia, mainly caused by the high prices for crude oil, is also seen in Kymenlaakso—most specifically in the field of logistics. In forestry-related exports, the ports of Kotka and Hamina form the most significant cluster in the country, in addition to which the two ports handle most of the transit traffic via Finland to Russia.

The proportions of the public sector, construction and primary production in the number of jobs in the region are in line with national figures. On the other hand, the proportions of jobs in trade and hospitality as well as other private-sector services are smaller than the national average. Compared to the level of 2000, the largest growth in people employed has occurred in traffic. The number of people employed by industry is notably lower than in 2000.

The pulp and paper industry together with the related metal industry in the region have both strengthened their position and gone through changes. Furthermore, the economic development of Kymenlaakso is more and more dependent on the financial development and trends within the EU and worldwide. For this reason, the global economic situation is immediately and significantly reflected in regional economic indicators. Due to the large size of the region's forestry sector, the economic and material flow indicators are highly indicative of the overall economic conditions within the forest sector.

The development of the economic indicators examined has been mainly positive. Compared to all of Finland, however, Kymenlaakso's economic growth during the current decade has been slow. The rate of growth in production has fluctuated in Kymenlaakso more intensely than in the country as a whole. Regional fluctuations in employment rates have also been more intense than the national average. In interpreting indicator data, regional development should therefore be compared to national and international economic development.

1.3 Socio-cultural indicators

The social and cultural indicators are used to evaluate the quality of life for the region's residents. The principal connection to the environmental and economic indicators is perhaps the fact that the economy and state of the environment as well as developments therein enable people to lead either satisfying or unsatisfying lives. The impact relationship can also be assumed to partially flow the other way around: residents leading satisfying lives generate a positive tone in the region's economy and give a boost to the assessment and development of the state of the environment—after all, it is the people living in the region who represent the most important driving force in such matters. This is a mutually strengthening (or weakening) circle. Such relationships between phenomena—as well as evaluations and combinations of issues across traditional sector boundaries—are essential, representing precisely the kind of thinking brought up by the ECOREG project to be discussed in follow-up analyses. Not only is there a clear connection between the main sectors of the economy, the environment and quality of life, but it is also easy to observe connections between individual phenomena, even if such connections cannot always be summed up as clear-cut cases of cause and effect. For example, unfavourable development in employment may lead to residents relocating out of the region, an increase in social exclusion, a deterioration of the health of the population and a decrease in the general attractiveness of the region.

The indicators used in the analyses can be divided into eight basic categories: population change, employment, social exclusion, health, education, culture and local identity. There are more than twenty individual indicators altogether. These can also be roughly divided (according to the model of the Finnish Environment Institute report 699) into indicators describing the current state of the region and, on the other hand, those describing its attractiveness or potential. The indicators describing the current state of Kymenlaakso include, for example, population change, employment rate as well as social exclusion and health. The attractiveness and future development potential of the region are illustrated by safety issues, the educational level of residents, research and development expenditures and local identity. Other types of categorizations are also feasible. No matter how the indicators are classified, however, it is advisable to use them to evaluate the region's situation from two perspectives: where are we now and, on the other hand, to which direction does the trend of recent development point? Again, regional data should be compared with either the national average (which, however, may sometimes be misleading) or other regions similar to Kymenlaakso.

The general image of Kymenlaakso reflected by the indicators can be summarized in two main observations: the region falls behind the national average in many aspects, but on the other hand, several phenomena have developed in a more favourable direction during the 21st century than in the country on average. We have four indicators with regard to which the aspect described is better in Kymenlaakso than in the country at large when it comes to both status and development during the 21st century: the number of households receiving social assistance, suicides, violent crimes (for which the development trend is, however, poorer than the national average) and the number of secondary education graduates. However, in most aspects the region falls behind the national average. The clearest indicators of poorer status and development in the region are: number of births, road traffic accidents (as well as traffic violations, which have not been compared here to other regions), total higher education graduates, research and development expenditures, number of loans from public libraries (a very slight difference) and the development in the circulation of newspapers. The phenomena where the region falls behind the national average but for which development during the current decade has been positive are: the life expectancy of newborns, number of premature deaths, unemployment rate, dependency ratio, net public expenditures on education and culture, voting rate in municipal elections and number of foreign citizens.

If we use the division into indicators describing the current state versus those indicating the attractiveness or 'potential' of the region, we can direct our attention as follows: Of the indicators describing current status, social exclusion and health have developed in a positive direction, and the unemployment rate has also gone down. In contrast, many of the indicators describing the attractiveness and future potential of Kymenlaakso are showing a negative trend: e.g., traffic safety, the low number of births in relation to deaths as well as some of the indicators relating to education, culture and local identity.

2 Development needs for the indicators

This section presents the research and development needs which have arisen in connection with the annual updates of indicator data.

Need for development	Implementation	Responsibility	Status
The LIPASTO model does not provide an accurate picture of traffic conditions in Kymenlaakso → to be replaced with local models more descriptive of the volume and quality of regional traffic.	Annual update '05	ATR/TP	Completed
Regular specialist group representation should be established and arrangements made for the practicalities of annual monitoring.	Annual update '05	JORY	Under way
The development of groundwater quality is currently described by the mean of samples taken at two measuring points. This should be complemented by, e.g., monitoring carried out by regional road administration.	Annual update '06	ATR/KAS, TP	Under way
In lieu of/parallel with current air quality indicators, an indicator based on air quality indexes should be added.	Annual update '06	ATR/KAS	Under way
Whether the monitoring data from the Virolahti measuring station included in the ILSE system of the Finnish Meteorological Institute could be included to complement other air quality indicators should be investigated.	Annual update '06	ATR/KAS	Under way
A noise indicator should be included in the annually updated indicators if and where possible.	Inventory by sector	ATR/TP, KAS	Under way
An indicator utilizing data gathered in moss ball studies carried out in the region should be added to the air quality indicators.	Inventory by sector	ATR/KAS	Under way
An indicator describing loads from agriculture and forestry should be included in the water quality indicators.	Inventory by sector	ATR/KAS	Under way
An indicator describing the number of environmental risks should, if possible, be added to the environmental indicators.	Inventory by sector	ATR/KAS	Under way
The possible inclusion of indicators describing developments in equality should be investigated in follow-up work regarding socio-cultural indicators.	Inventory by sector	ATR/TEK	Under way
In the future, it would be advisable to include indicators measuring entrepreneurship in the economic indicators.	Inventory by sector	ATR/KLL	Under way
ABBREVIATIONS USED: JORY = Steering group, ATR = specialist group, KLL = Regional Council of Kymenlaakso, KAS = Southeast Finland Regional Environment Centre, TEK = TE Centre, TP = Regional Road Administration of Southeast Finland			

3 Summary

This project employed environmental, economic and socio-cultural indicators in investigating the current eco-efficiency status of the Kymenlaakso region and, on the other hand, the direction in which developments are pointing with regard to the various indicators. An assessment of the state of sustainable development in Kymenlaakso is being carried out as exceptionally wide-scale collaboration, including not only environmental experts but professionals specialising in economic and socio-cultural issues as well.

According to expert evaluations, the development measured by the environmental indicators has been mainly positive: carbon dioxide emissions caused by the burning of fossil fuels in industry and traffic have been on a decline in Kymenlaakso since the early 1990s. The decrease is principally due to the fact that the paper industry has shifted to using biofuel. A similar downward trend is also seen in emissions of nitrogen oxides and sulphur. On the other hand, the volume of waste landfilling, for example, has developed in an unfavourable direction for the environment, despite good recycling facilities. The recovery rate of settlement-based waste also remains quite low. According to eco-efficiency evaluations, nitrogen loads to waters and traditional biotopes are issues which still require more effort. With the environmental indicators used so far, it is relatively difficult to compare the state of Kymenlaakso to, for example, that of Finland at large. As a highly industrialised region, the air or water quality in Kymenlaakso is poorer than in many other sparsely populated Finnish regions, but in comparison to the Helsinki region, for example, the situation is reversed. So far, the poor availability and dispersion of data concerning Finland as a whole have also presented problems.

The economic indicators are still demonstrating a mainly positive development: production has grown and the disposable income per resident increased. On the other hand, value added per capita has grown more slowly than in other parts of the country. According to the economic indicators, the economy of the Kymenlaakso region is very close to the national average.

The social and cultural indicators are still clearly showing a worse state of affairs, measured by several indicators, in comparison to the national average. The diagrams representing population development in Kymenlaakso fall below the national average when examining the number of births. Furthermore, the number of deaths before the age of 65 is notably higher than in other parts of the country. Explanations for this can be found in, among other factors, age structure, number of suicides and accidents, level of subsistence and the general pleasantness of the living environment. However, signs of positive development are now seen even to the extent that we can evaluate the overall development within this sector to have been positive. According to cultural indicators, the use of public libraries has been active, but the net public expenditures on education and culture have remained below national average despite their growth. The number of nights spent in hotels, describing the attractiveness of the region, and the circulation of newspapers have declined.

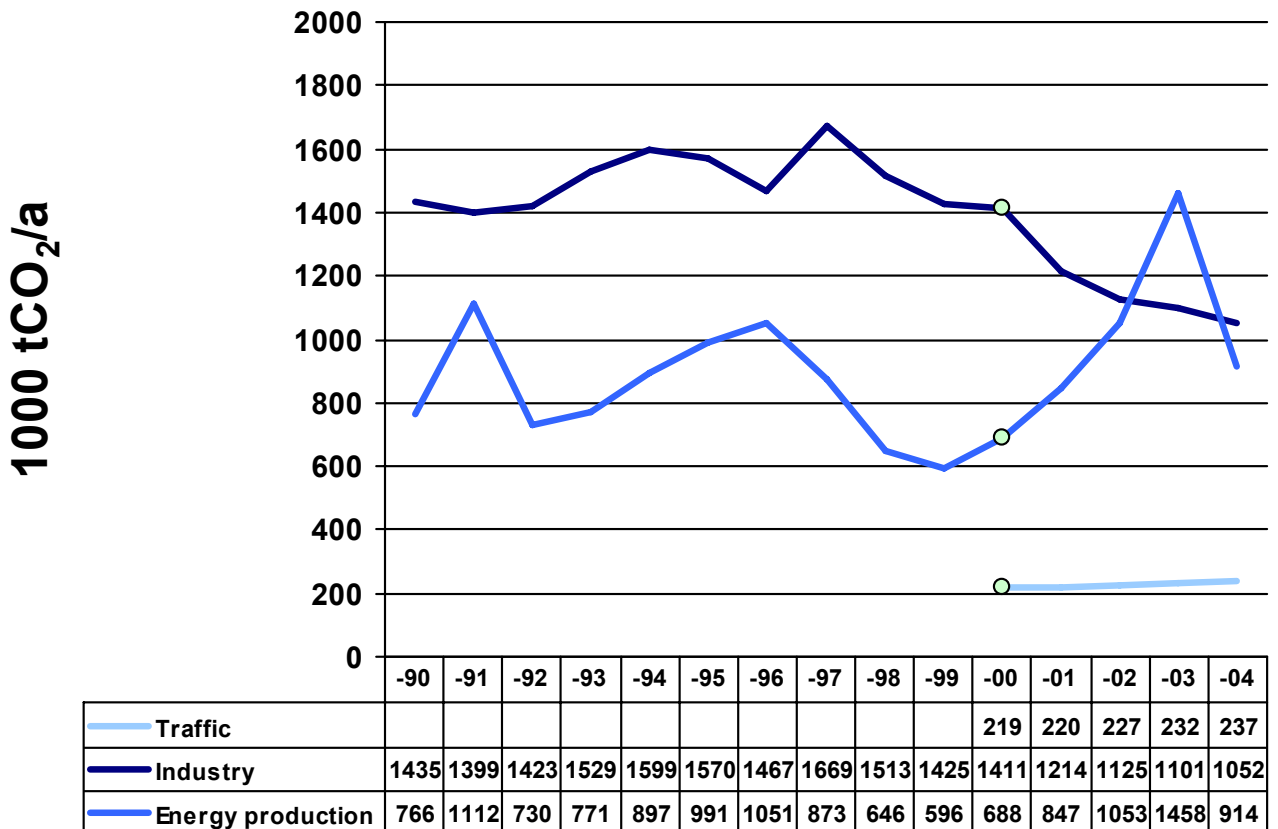
The changes occurring in society require that the indicators be constantly re-evaluated. In some cases, redefining the source of information will suffice, as has occurred in Kymenlaakso with the intense growth in goods traffic. On the other hand, it will sometimes be necessary to consider including new indicators due to, for example, the development of information society. The first-mentioned changes can be implemented in connection with annual updates, but structural changes will at times call for in-depth analyses and consideration. Changes should not jeopardise the comparability of results on a long-term basis.

LIST OF INDICATORS

No.	DESCRIPTION OF INDICATOR	PAGE
Y1	CO ₂ emissions from industry, energy production and road traffic	1
Y2	No _x emissions from industry, energy production and road traffic	2
Y3	SO ₂ emissions from industry and energy production	3
Y4	Hg emissions from industry and energy production	4
Y5	Cd emissions from industry and energy production	5
Y6	Pb emissions from industry and energy production	6
Y7	Emissions of dioxins and furans	7
Y8	Emissions of polyaromatic hydrocarbons	8
Y9	Average number of days when the limit value for the average daily concentration (50 µg/m ³) of PM ₁₀ is exceeded	9
Y10	Average number of days/monitoring point when the average concentration of TRS exceeds 4 µg/m ³	10
Y11	Nitrogen loads to waters from communities, rural settlements and industry	11
Y12	Average annual groundwater chloride concentrations (mg/l)	12
Y13	Average annual groundwater nitrate nitrogen concentrations (µg/l)	13
Y14	Riparian zone contracts concerning special measures of agri-environmental support	14
Y15	Traffic mileages	15
Y16	Oil and chemical accident	16
Y17	Traditional biotope, landscape management and biodiversity enhancement contracts concerning special measures of agri-environmental support	17
Y18	Contracts concerning environmental support for forestry	18
Y19	Total area of concervation areas	19
Y20	Total area of regeneration fellings	20
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Y22	Quantity of gravel and rock extracted	22
Y23	Landfilling of municipal waste from households	23
Y24	Recovery rate of municipal waste from households	24
Y25	Consumption of electricity	25
Y26	Consumption of district heat	26
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LIST OF INDICATORS

No.	DESCRIPTION OF INDICATOR	PAGE
S1	Net migration of Kymenlaakso excluding international immigration	34
S2	Excess of births per 1,000 persons	35
S3	Dependency ratio: the number of non-employed persons per 100 employed persons	36
S4	Number of foreign citizens	37
S5	Unemployment rate (the proportion of the unemployed in the workforce %)	38
S6	Job structure	39
S7	Number of households receiving social assistance/100,000 persons	40
S8	Suicides/100,000 persons	41
S9	Number of deaths before the age of 65/100,000 persons	42
S10	Life expectancy of newborns	43
S11	Traffic violations discovered by the police	44
S12	Violent crimes/1,000 persons	45
S13	Road traffic accidents/1,000 persons	46
S14	Number of secondary and higher education graduates	47
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K1	Net public expenditures on education and culture	49
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K4	Nights spent in hotels	52
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T1-K5	SPECIALIST EVALUATIONS FOR THE DEVELOPMENT TRENDS OF KYMENLAAKSO'S ECONOMIC AND SOCIO-CULTURAL INDICATORS IN 2004	55
Y1-Y27	THE ABSOLUTE DEVELOPMENT OF KYMENLAAKSO'S ENVIRONMENTAL INDICATORS AND THEIR RELATIONSHIP TO NATIONAL AVERAGES IN 2004	56
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S1-K5	THE ABSOLUTE DEVELOPMENT OF KYMENLAAKSO'S SOCIO-CULTURAL INDICATORS AND THEIR RELATIONSHIP TO NATIONAL AVERAGES IN 2004	58



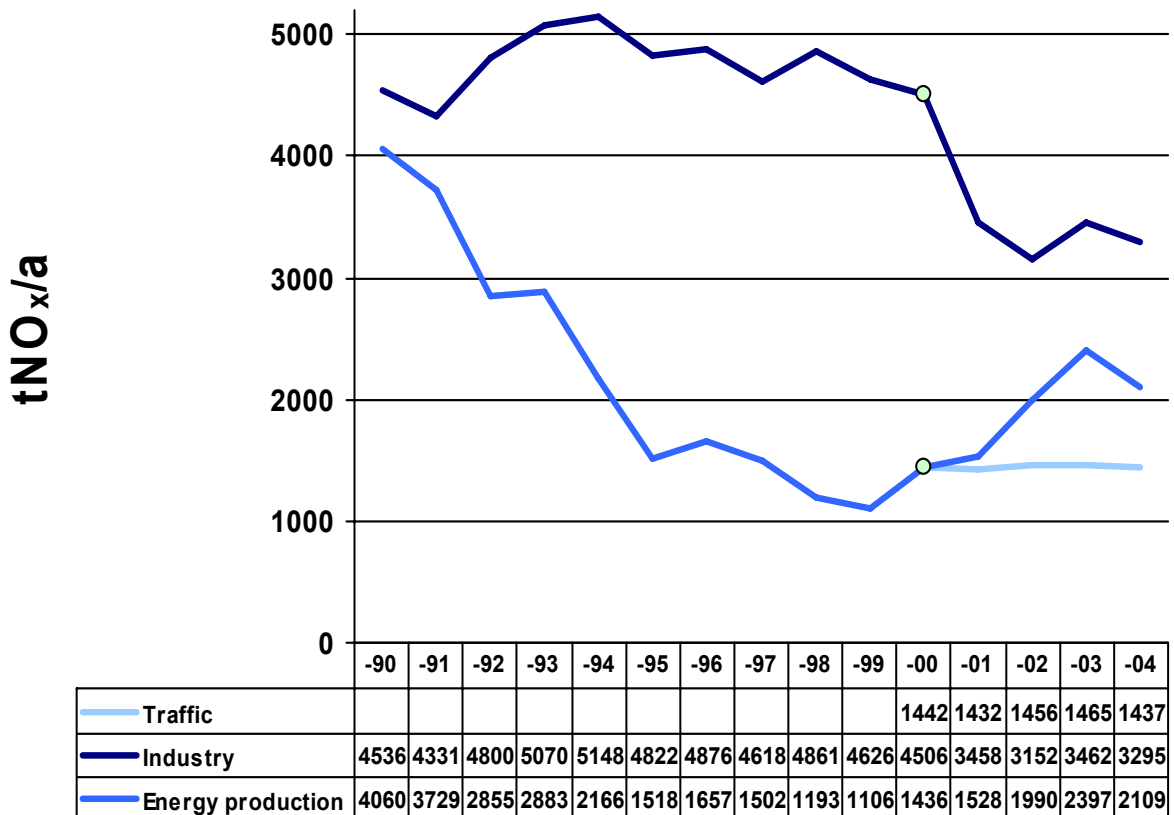
Source: VAHTI, Traffic: Finnish Road Enterprise / IVAR spreadsheet

Evaluation: Carbon dioxide emissions generated by the burning of fossil fuels in industry have declined in Kymenlaakso throughout the monitoring period, mainly due to the fact that the pulp and paper industries have begun to shift to biofuel or fossil fuels producing less carbon dioxide. The emissions of fossil carbon dioxide from energy production are principally generated by the production facilities in the Mussalo area of Kotka and are influenced not only by production volumes but by the choice of fuel as well.

The production volumes of condensation electricity are highly dependent on the price of market electricity.

Traffic mileages increased by 3% during the last year of the period under investigation.

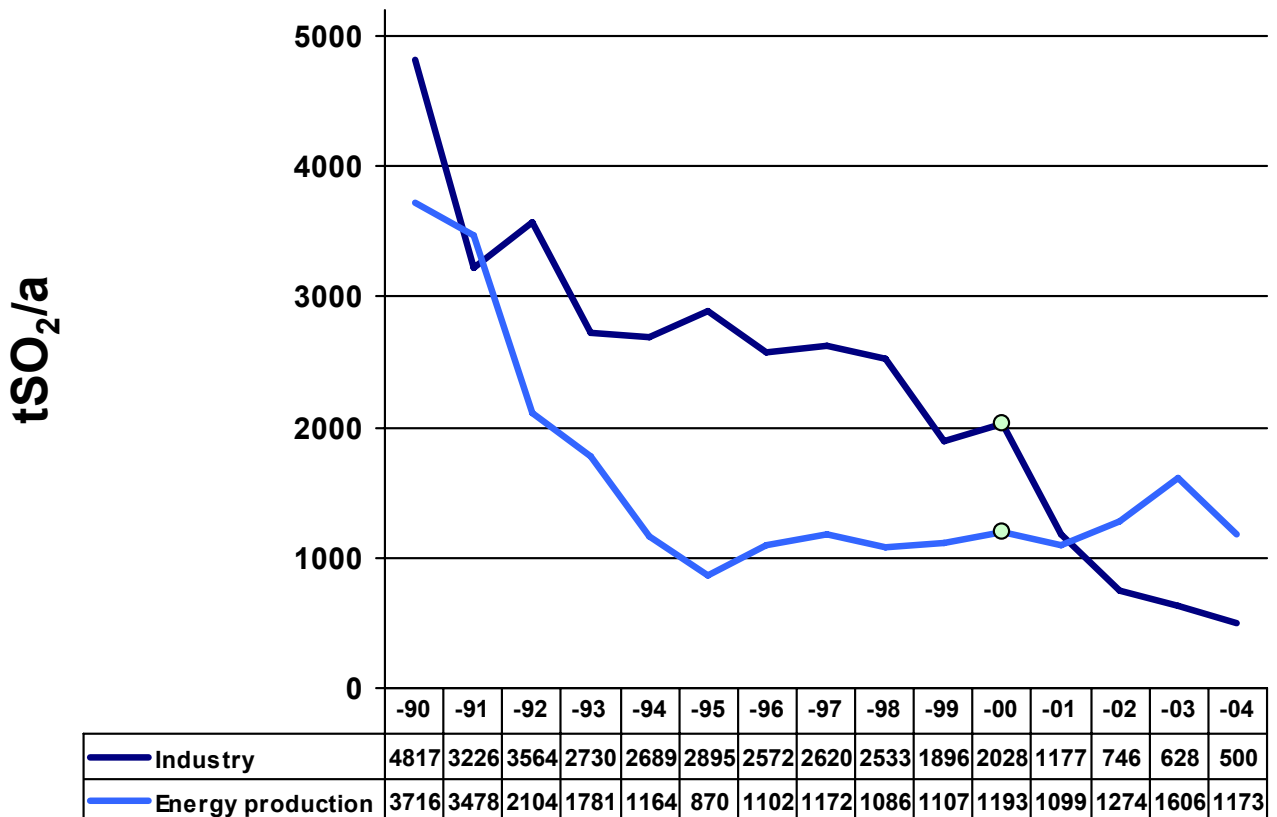
Looking at the trend in the overall volume of carbon dioxide emissions, the development for 2000–2004 can be considered **positive**.



Source: VAHTI

Evaluation: The emissions of nitrogen oxides from industry have been influenced by the introduction of combustion methods which generate fewer nitrogen oxides as well as by the increase in the use of natural gas. The development in nitrogen oxides emissions from energy production has also been affected by market electricity price fluctuations. Emissions of nitrogen oxides from traffic have decreased due to continuously improved combustion techniques.

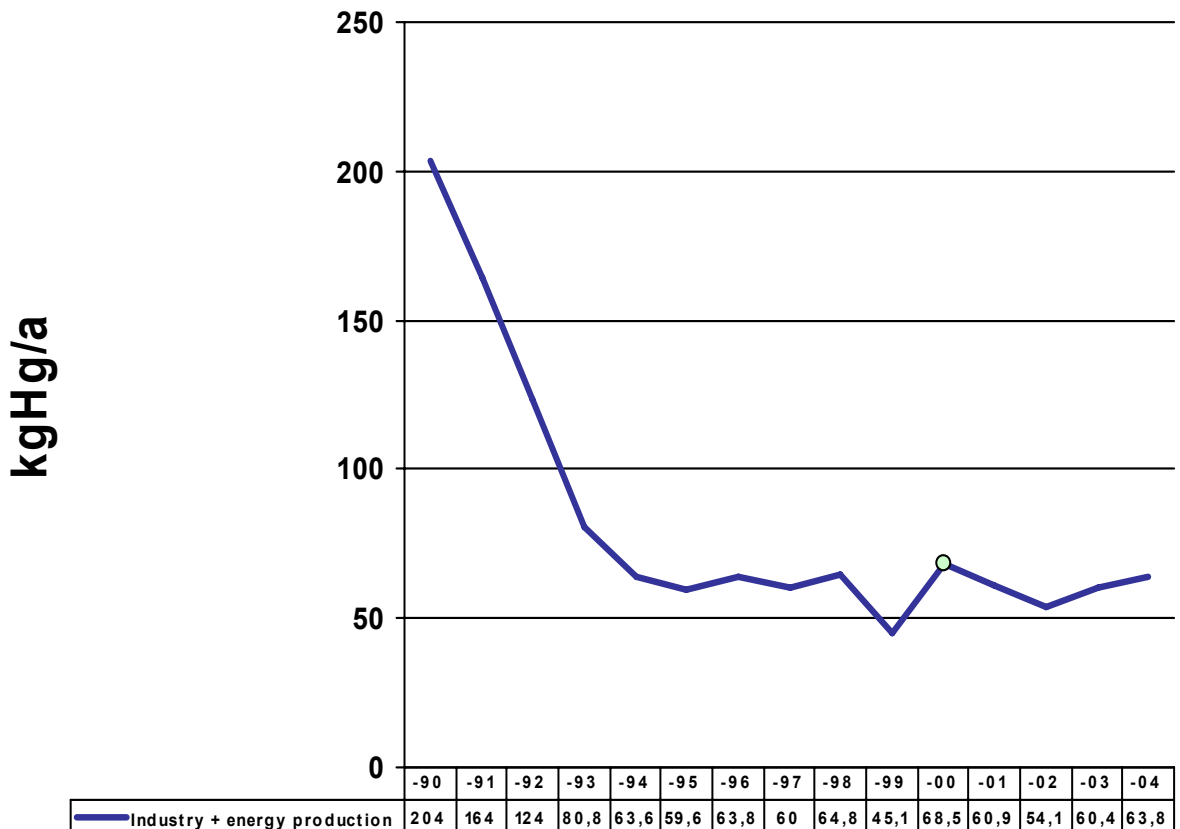
With industry dominating the development in nitrogen oxides emissions, the trend for emissions of nitrogen oxides in 2000–2004 can be considered **positive**.



Source: VAHTI

Evaluation: The decrease in sulphur dioxide emissions from industry and energy production has mostly been influenced by the introduction of fuels which contain less sulphur. In Kymenlaakso, the decline in sulphur dioxide emissions from energy production has been affected by the increase in the utilisation of natural gas.

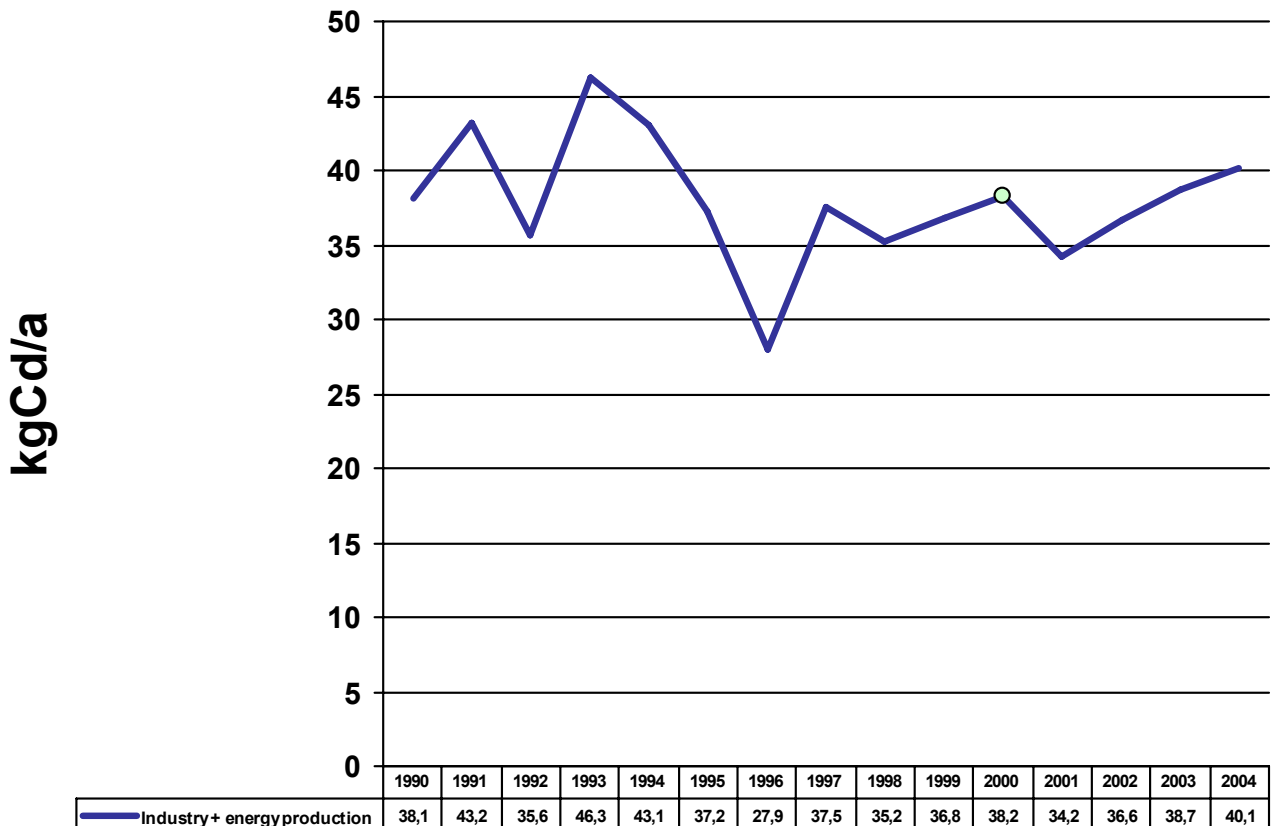
Due to the notable decrease in sulphur dioxide emissions from industry, we can conclude that the development trend for sulphur dioxide emissions in 2000–2004 has been **positive**.



Source: VAHTI/fuels

Evaluation: The data on mercury emissions from industry and energy production has been retrieved from the VAHTI database and complemented with emissions figures calculated as based on the fuel data stored in VAHTI. Mercury emissions have remained at a steady level since the mid-1990s. The fall in emissions in the early 1990s was mainly caused by changes made in the processes of the Finnish Chemicals company.

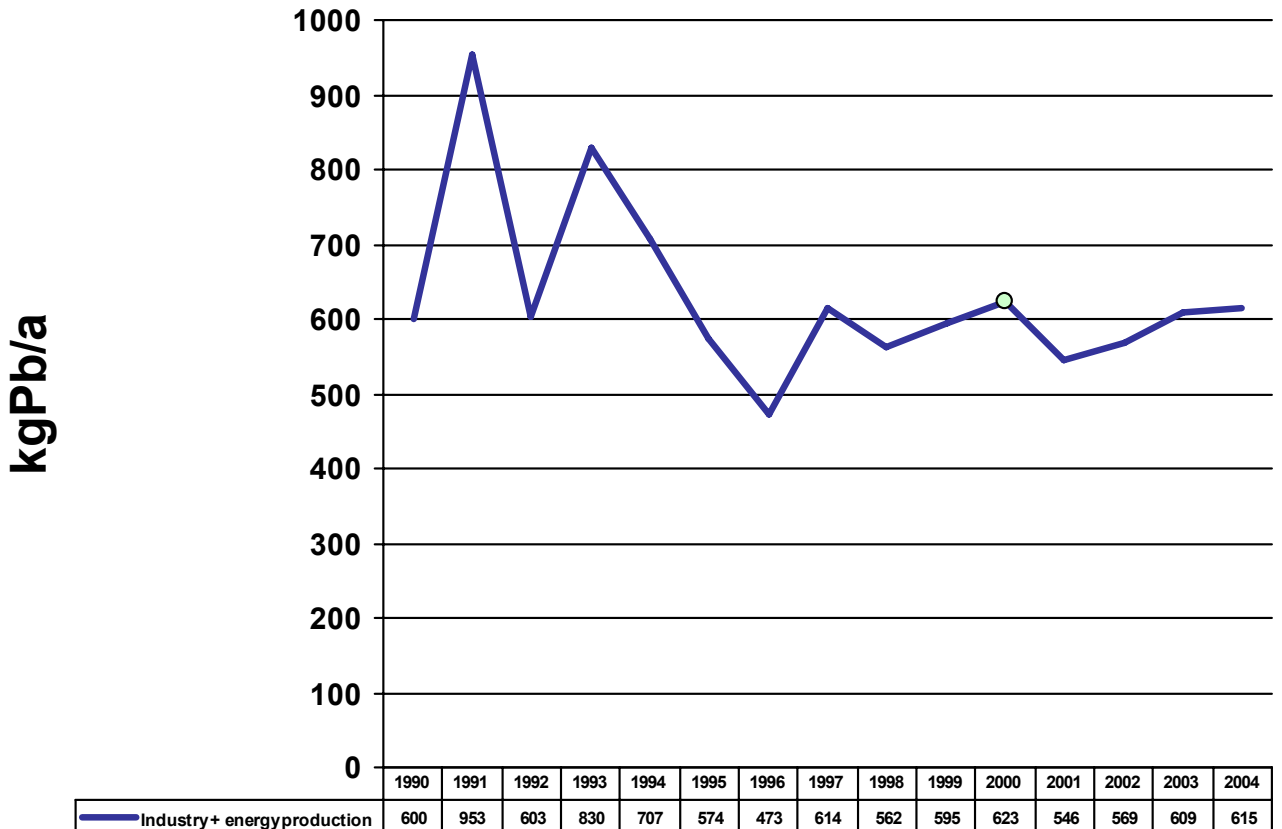
Mercury emissions are calculated by boiler according to generally accepted methods. The result shows only a roughly 7% decline in emissions levels during 2000–2004, but due to the ambiguities of the calculation process, the trend can be evaluated, based on currently available data, as **neutral**.



Source: VAHTI/fuels

Evaluation: The data on cadmium emissions from industry and energy production has been retrieved from the VAHTI database and complemented with emissions figures calculated as based on the fuel data stored in VAHTI. Cadmium emissions have remained at a steady level throughout the monitoring period.

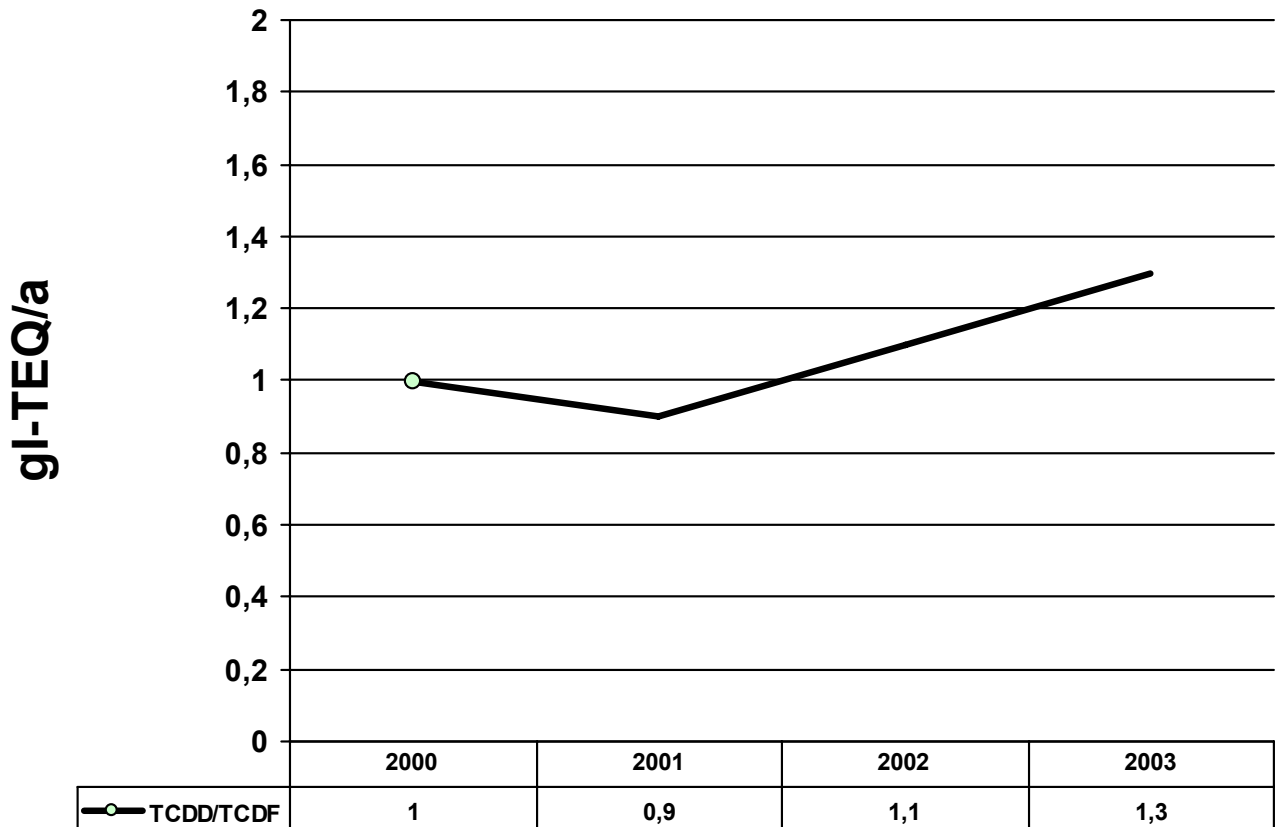
Cadmium emissions are calculated by boiler according to generally accepted methods. The result shows only an approximately 5% increase in emissions levels for 2000–2004, but due to the ambiguities of the calculation process, the development trend can, based on currently available data, be estimated as **neutral**.



Source: VAHTI/fuels

Evaluation: The data on lead emissions has been retrieved from the VAHTI database and complemented with emissions figures calculated as based on the fuel data stored in VAHTI. Lead emissions have declined from the level of the early 1990s and then remained steady from the mid-1990s onwards.

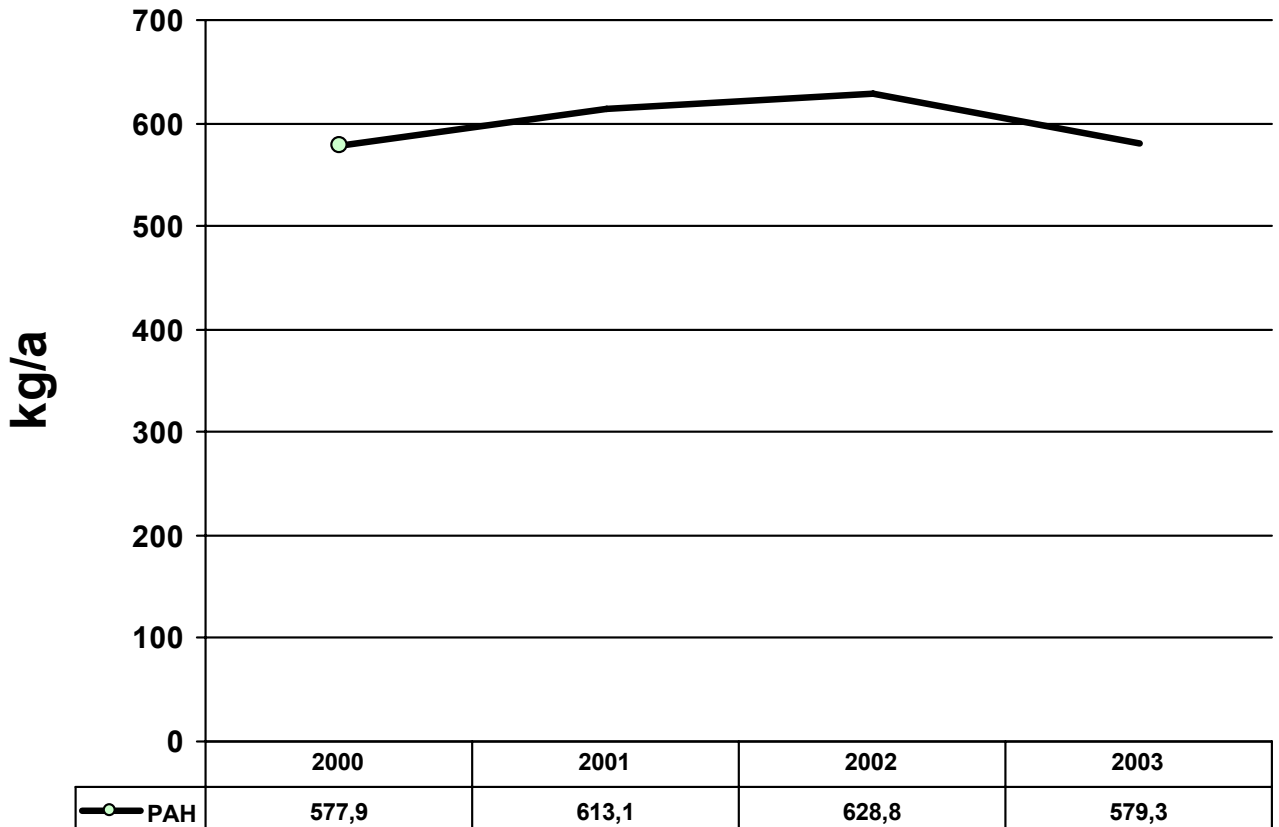
Lead emissions are calculated by boiler according to generally accepted methods. The results show only a roughly 1% decline in the emissions levels of 2000–2004, but due to the ambiguities of the calculation process, the trend can, based on currently available data, be considered **neutral**.



Source: Finnish Environment Institute (SYKE)/Air Emission Data System (IPTJ)

Evaluation: A significant proportion of the most harmful POP compounds are formed as a result of incomplete combustion reactions. Emissions of dioxins and furans are calculated with the Finnish Environment Institute data processing system for emissions into the air (IPTJ). The data for 2004 will be calculated during late 2005 and early 2006. Data for 1990–1999 are currently being calculated: the estimated time of publication is in 2005.

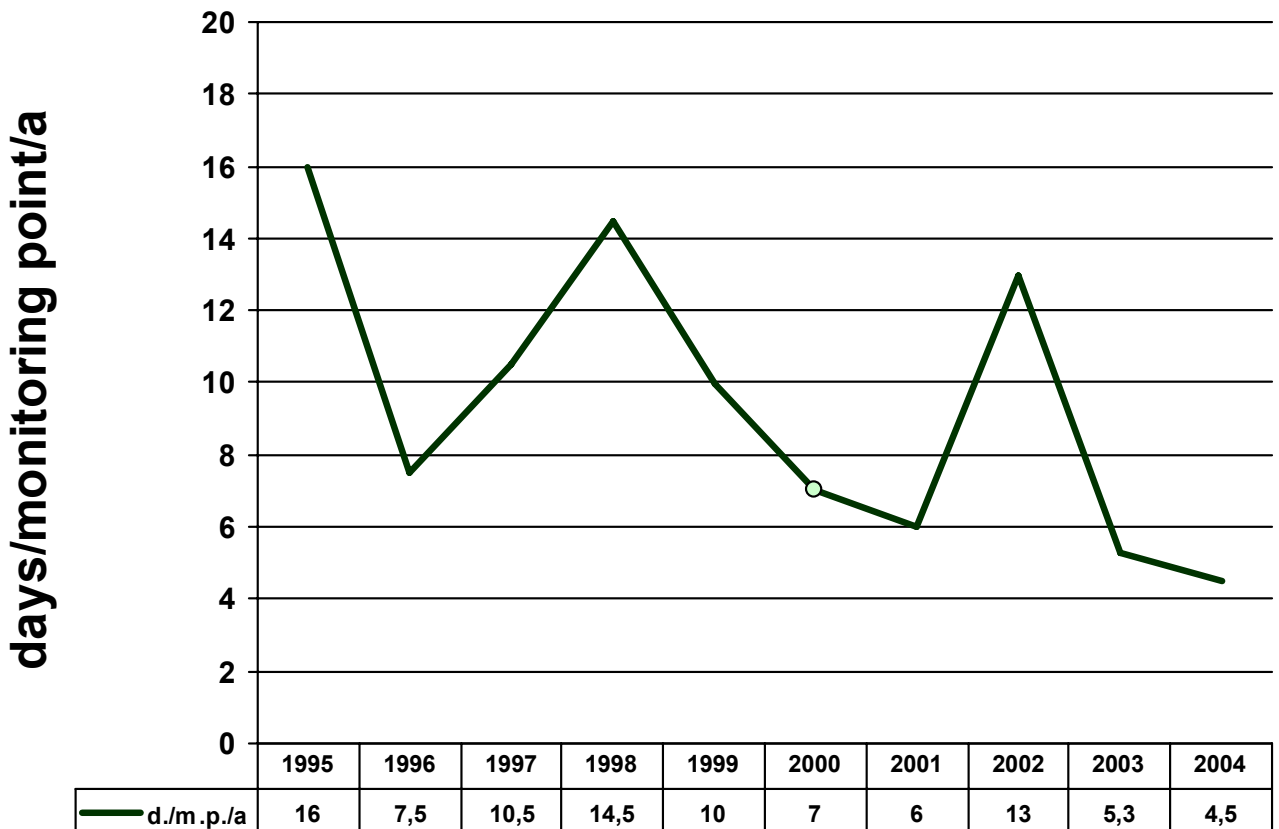
The increase in dioxin and furan emissions between 2000 and 2003 estimated with the IPTJ system amounted to approximately 30%, but due to the ambiguities of the calculation process, the development trend for the period in question can be estimated as being **neutral**.



Source: Finnish Environment Institute (SYKE)/Air Emission Data System (IPTJ)

Evaluation: A significant proportion of the most harmful POP compounds are formed as a result of incomplete combustion reactions. PAH emissions are calculated with the Finnish Environment Institute data processing system for emissions into the air (IPTJ). The data for 2004 will be calculated during late 2005 and early 2006. Data for 1990–1999 are currently being calculated: the estimated time of publication is in 2005.

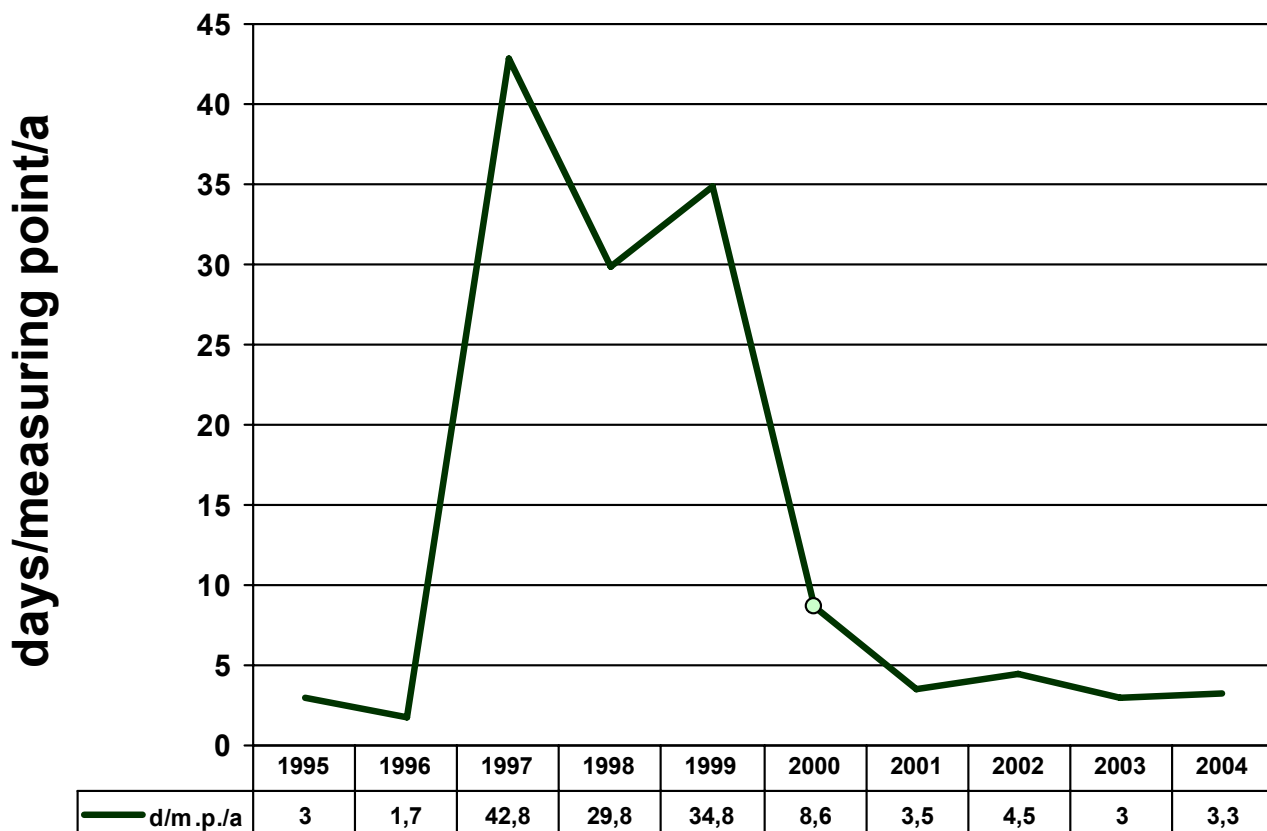
The PAH emissions calculated with the IPTJ system remained steady in 2000–2004, but due to the ambiguities of the calculation process, the development trend for the period in question can be deemed **neutral**.



Source:Finnish Meteorological Institute/ILSE

Evaluation: Five monitoring stations were used during the period of investigation. According to station descriptions, two of the five measure emissions from traffic (central Karhula and Kouvola) and another two background concentrations (Virolahti/rural and Kotka/urban), with the remaining one measuring the air quality of an industrial area (Rauhala/Suburban/Industry). The data for 1995–1998 only include the emissions recorded at the monitoring points measuring emissions from traffic. The peak in 2002 is due to the limit value surpasses in the town centre of Kouvola and the Rauhala monitoring point in Kotka.

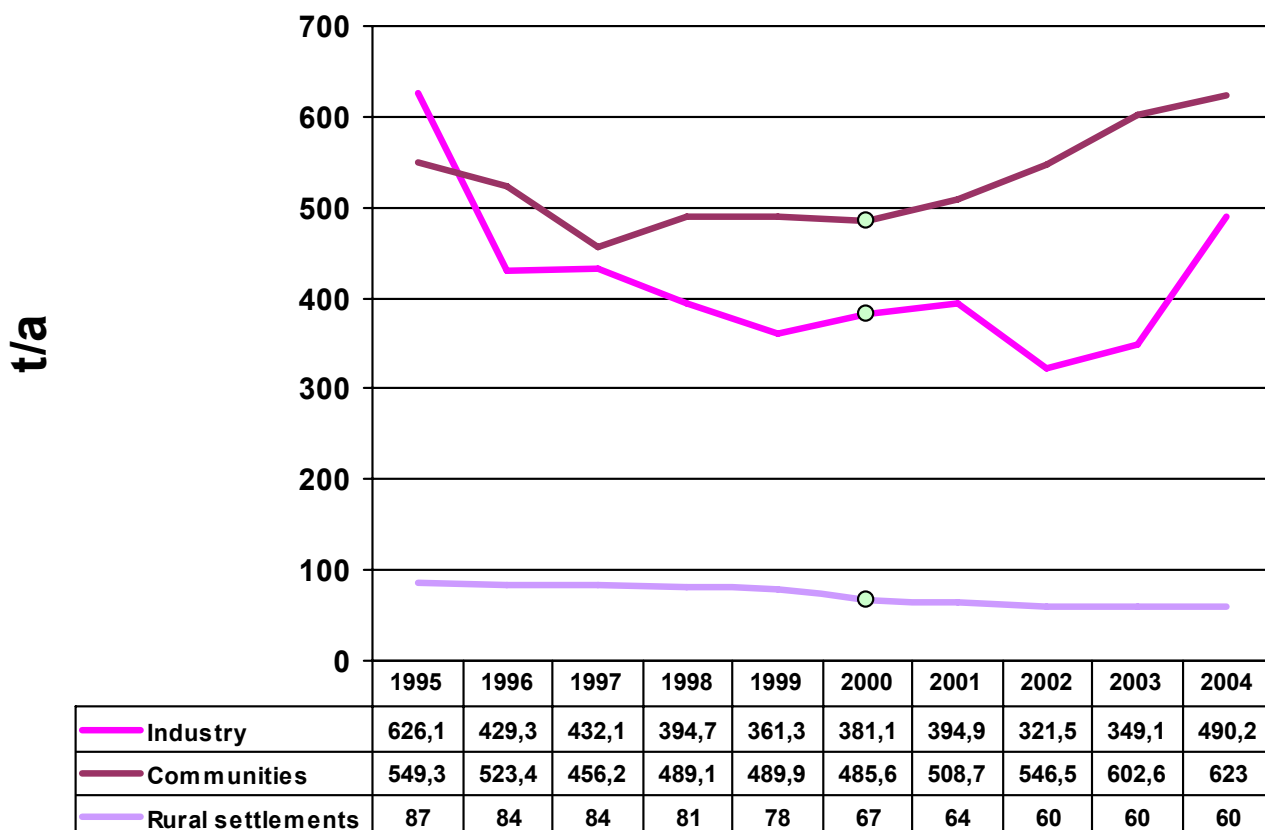
Despite the ‘emission peak’ of 2002 and the ambiguity factors presented in the above, we can conclude that the overall development trend for PM₁₀ emissions during 2000–2004 has been **positive**.



Source:Finnish Meteorological Institute/ILSE

Evaluation: Because of the number and location of the measuring points used, different years cannot be accurately compared with each other. The results presented here clearly show the impact of the addition of the two measuring points in Kotka to the monitoring system. However, improvement has occurred in the Kotka area during the late 1990s, as the number of days when concentrations exceed limit values has decreased. In interpreting these results, we must consider the fact that they do not directly communicate the average number of days during a year when odour pollution has occurred in the region: the same odour may have been registered at several measuring points in one day. Indeed, the results are more indicative of the distribution and range of odours. Weather conditions and the location of the measuring stations also influence the results. For example, the moving of the second measuring point in Kotka from Hakamäki to Rauhala in 2000 has introduced a decline in the concentrations measured in Kotka.

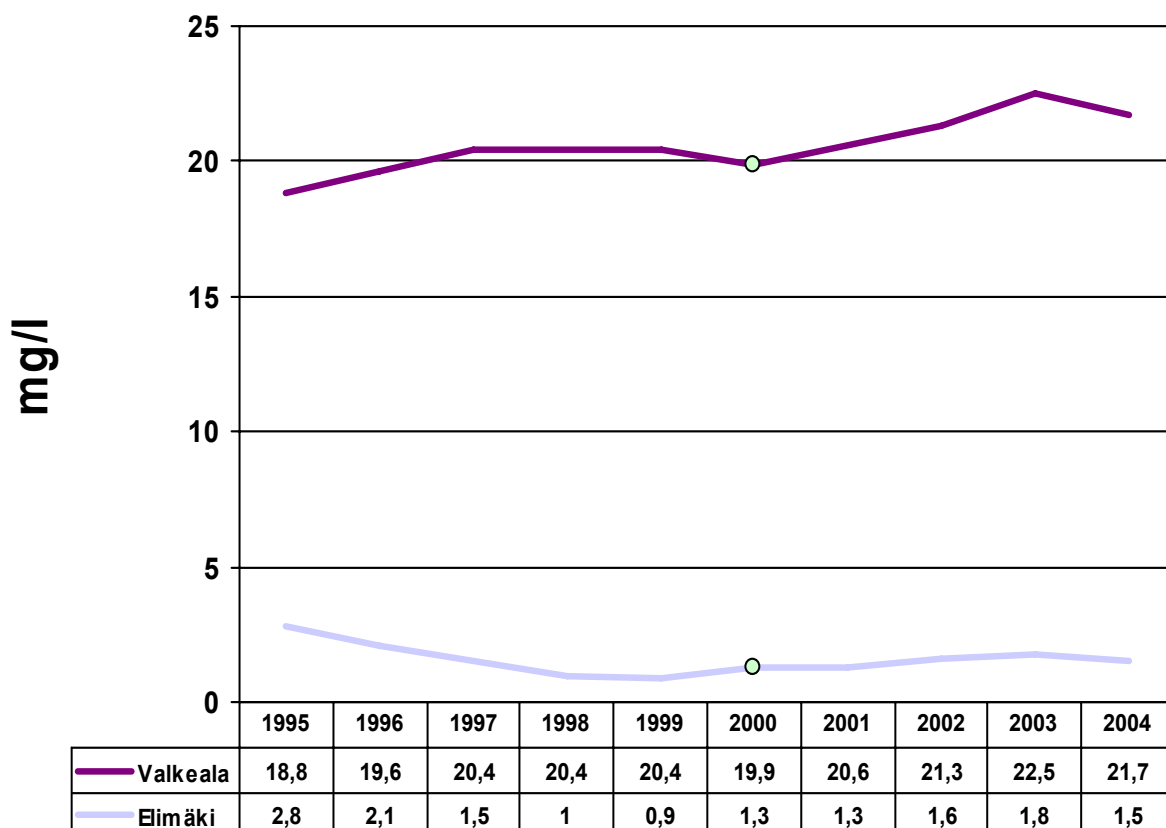
Considering the ambiguity factors mentioned above, the development trend for 2000–2004 can be considered **positive**.



Source: VAHTI, HERTTA

Evaluation: The nitrogen loads in the industrial wastewaters of Kymenlaakso are dominated by discharges from the chemical wood processing industry. These have declined since the mid 1990s, with the exception of the last few years. In addition to changes in production volumes, nitrogen loads from industry have been influenced by investments made in the wastewater treatment facilities of production plants. For communities, however, the trend has remained in a slightly upward direction throughout the period of investigation. The development regarding rural settlements has been impacted by the constant increase in the number of households joining the sewer system, which has decreased the loads from rural settlements.

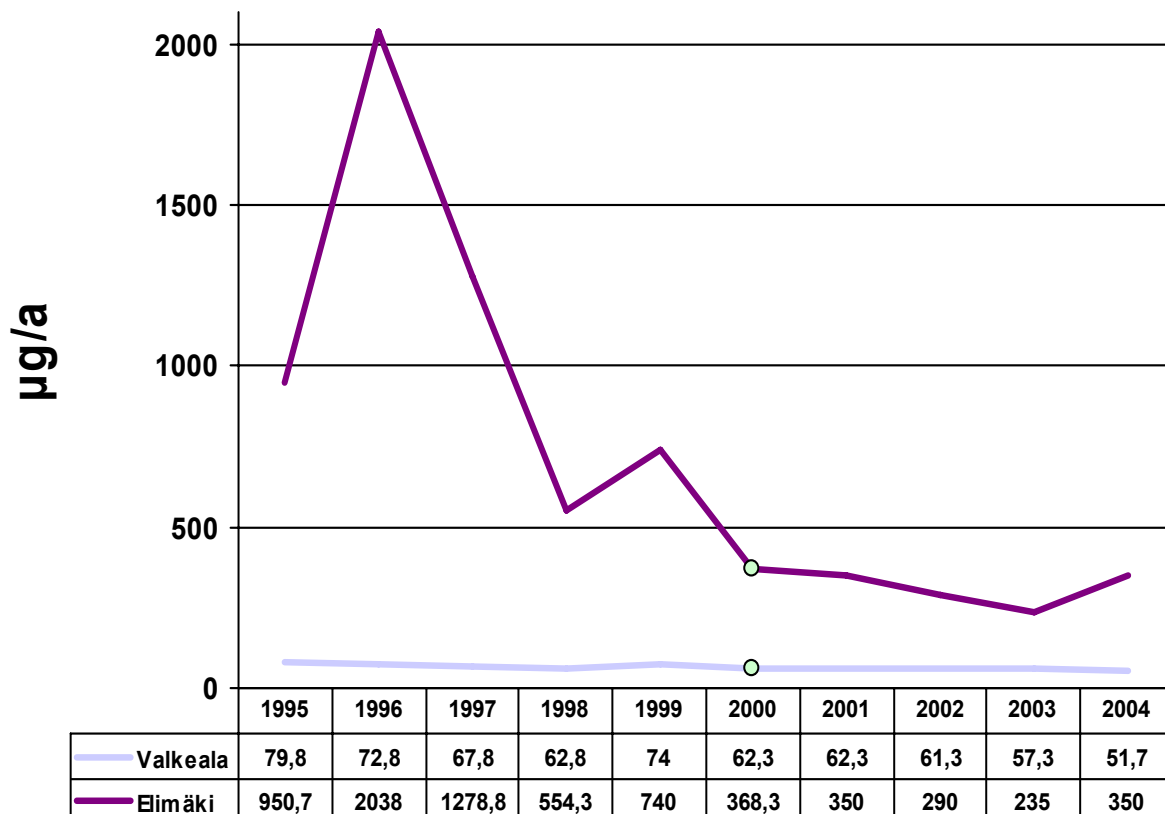
Due to the increase in nitrogen loads from both industry and communities, the development trend for this indicator can be interpreted as having been **negative** during 2000–2004.



Source: HERTTA

Evaluation: No significant fluctuations have occurred in groundwater chloride concentrations measured at either monitoring station during the period 1995–2004. In Valkeala, the concentrations have been on a steady increase and in Elimäki on a steady decline. The high chloride concentrations in Valkeala are caused by the salting of the road travelling across the groundwater recharge area.

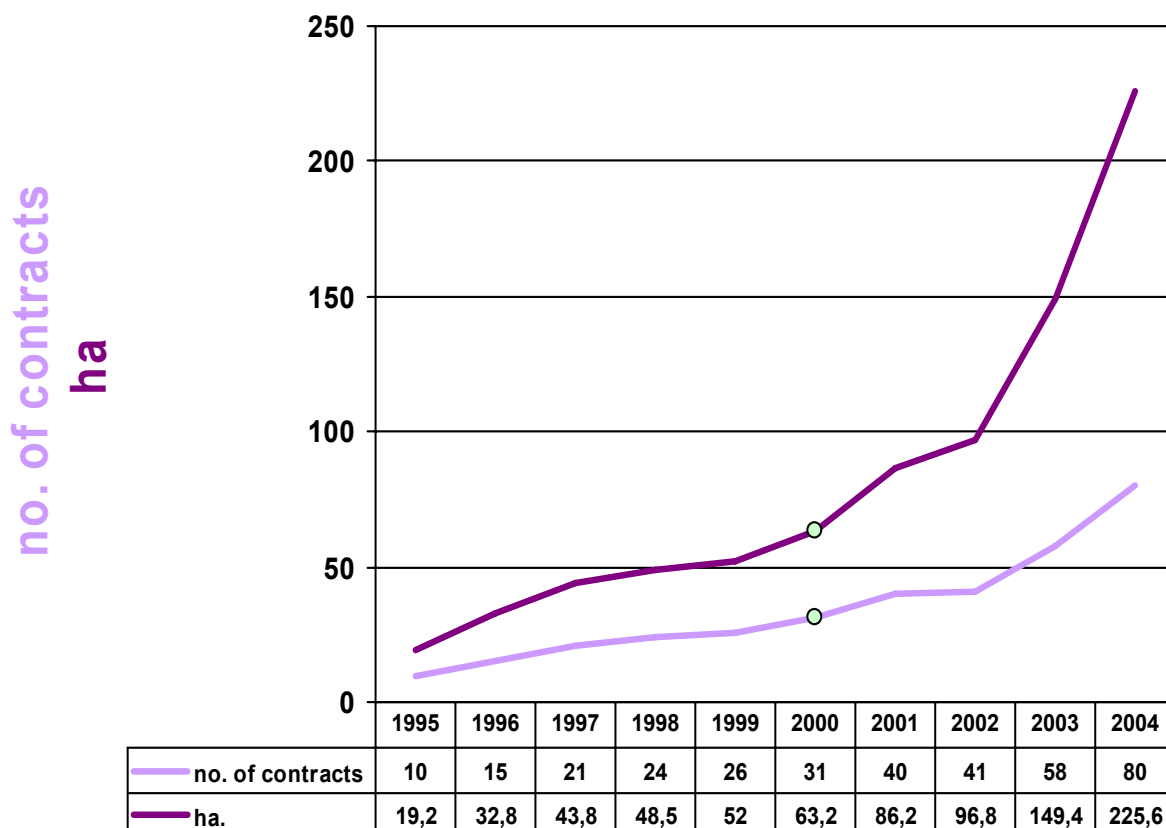
The chloride concentrations at both measuring points have shown a slight rise between 2000 and 2004, and therefore the overall development trend can be considered **negative**.



Source: HERTTA

Evaluation: At the Valkeala monitoring station, nitrate concentrations have remained low throughout the period of investigation, whereas those measured in Elimäki have been manifold compared to the Valkeala measurements. Excluding the 1996 peak in Elimäki (the reason for which has not been found), nitrate concentrations have remained on a decline throughout the period in question.

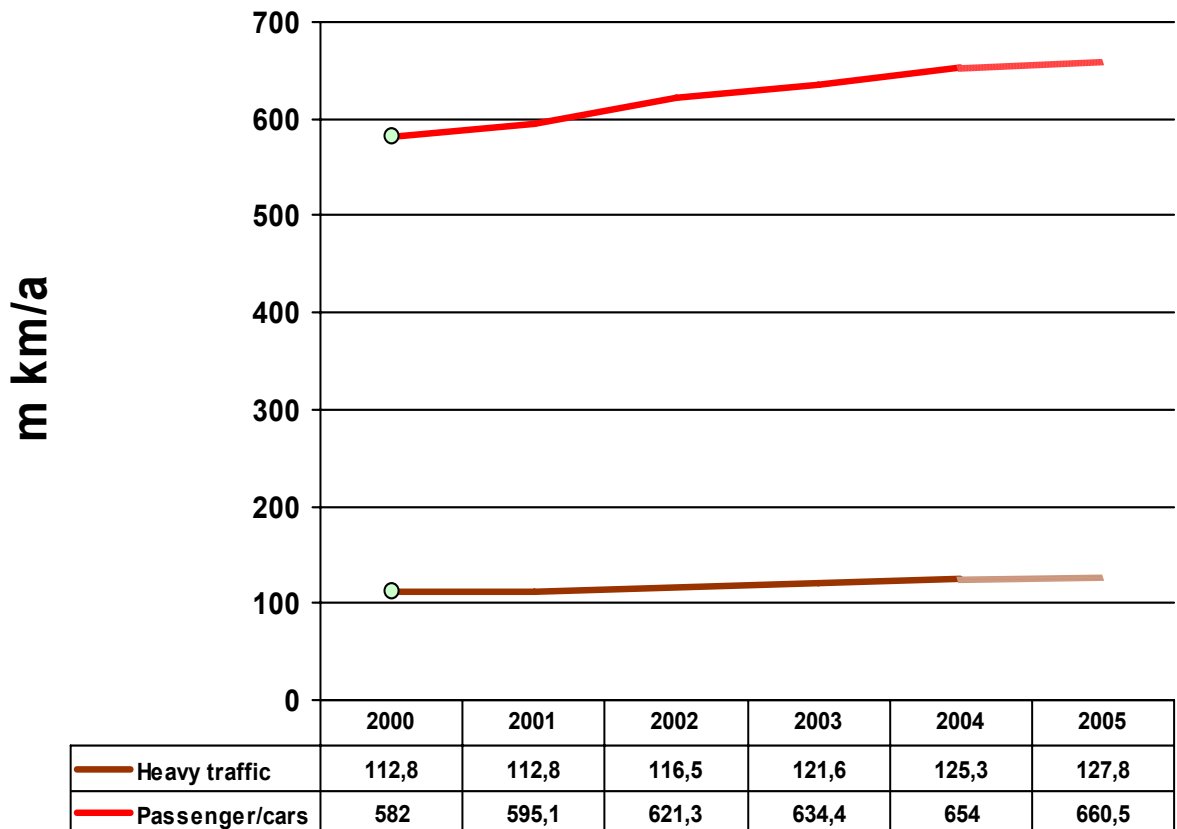
Nitrate nitrogen concentrations have mainly shown a downward trend throughout the period of investigation, and therefore the development trend for 2000–2004 can be deemed **positive**.



Source: TE Centre for Southeast Finland

Evaluation: The number of and area covered by riparian zone contracts concerning special measures of agri-environmental support have increased constantly since 1995. From 2000 onwards, the growth has intensified, and a record-high number of 17 new contracts were made in 2003. Though the number of riparian zones established has been low in relation to the actual need for them, an increase in interest towards riparian zones as a means of preventing eutrophication can be observed.

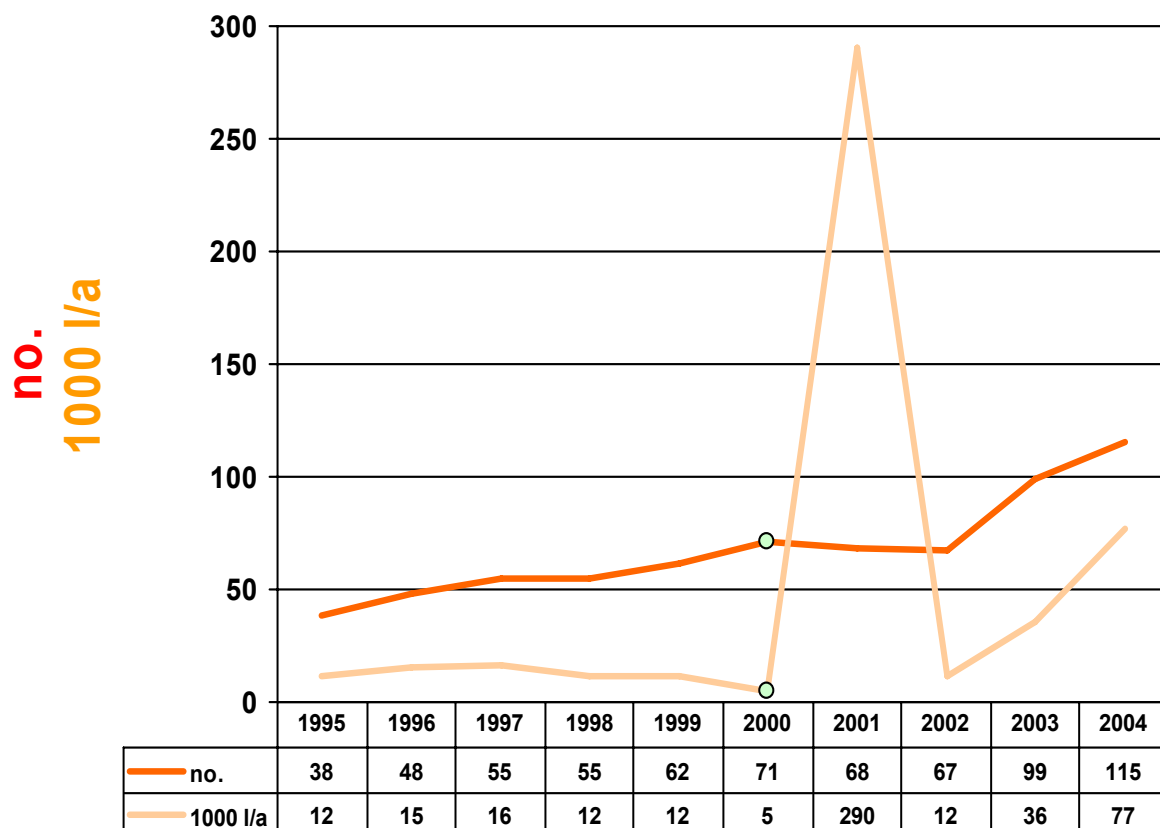
The number of and area covered by riparian zone contracts have grown intensely during 2000–2004, and the development trend for this indicator during the period in question can therefore be considered **positive**.



Source: Finnish Road Enterprise

Evaluation: Traffic mileages have been calculated with the IVAR software for the main roads of the Regional Road Administration of Southeast Finland in Kymenlaakso (arterial highways 6, 7, 12, 15 and 26 as well as regional highway 46). The definition light traffic includes private cars and vans. Heavy traffic includes coaches and lorries. Traffic mileages grew by 3% in 2005.

Traffic mileages in the Kymenlaakso region increased more rapidly than expected between 2000 and 2004, which is why the development trend for this environmental indicator during the period in question is to be deemed **negative**.



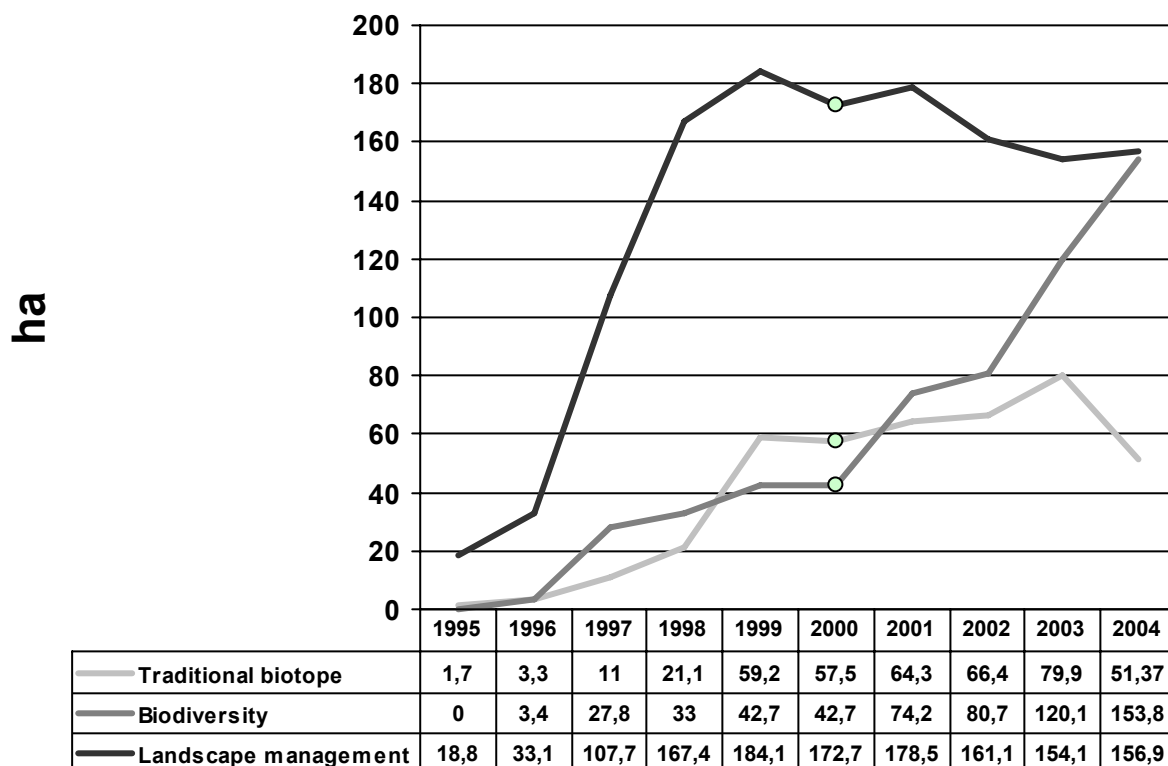
Source: VAKAS/PRONTO

Evaluation: This indicator represents the number of oil and chemical accidents occurring in the region. Data for the indicator have been gathered from the VAKAS register maintained by the Southeast Finland Environment Centre (the oil and chemical accident register), from the PRONTO register maintained by the Emergency Response Centre Administration, and from the annual reports on oil accidents prevention expenditures, with the appended oil accident statistic form, sent each year to the Southeast Finland Regional Environment Centre.

The number of oil and chemical accidents kept increasing until 1999. Data for 2003 and 2004 has been retrieved from the PRONTO register of the Emergency Response Centre Administration (the earlier data only from VAKAS), which means that the increase in the number of accidents shown for the most recent years is actually due to a difference in statistical methods.

The quantities of oil and chemical spills into the environment has fluctuated extensively during the period investigated. The differences in methods of compiling statistics and acquiring information mentioned above yield their impact on the quantities of chemicals recorded, and the data collected prior to 2003 is therefore not directly comparable with later data. Due to the ambiguities concerning statistics, evaluating the development trend for oil and chemical releases will require further development and harmonisation of the registers and statistical methods used by various instances in order to arrive at more accurate data.

In spite of the ambiguity factors mentioned above, the development trend for this indicator during 2000–2004 can be assessed as **negative**.

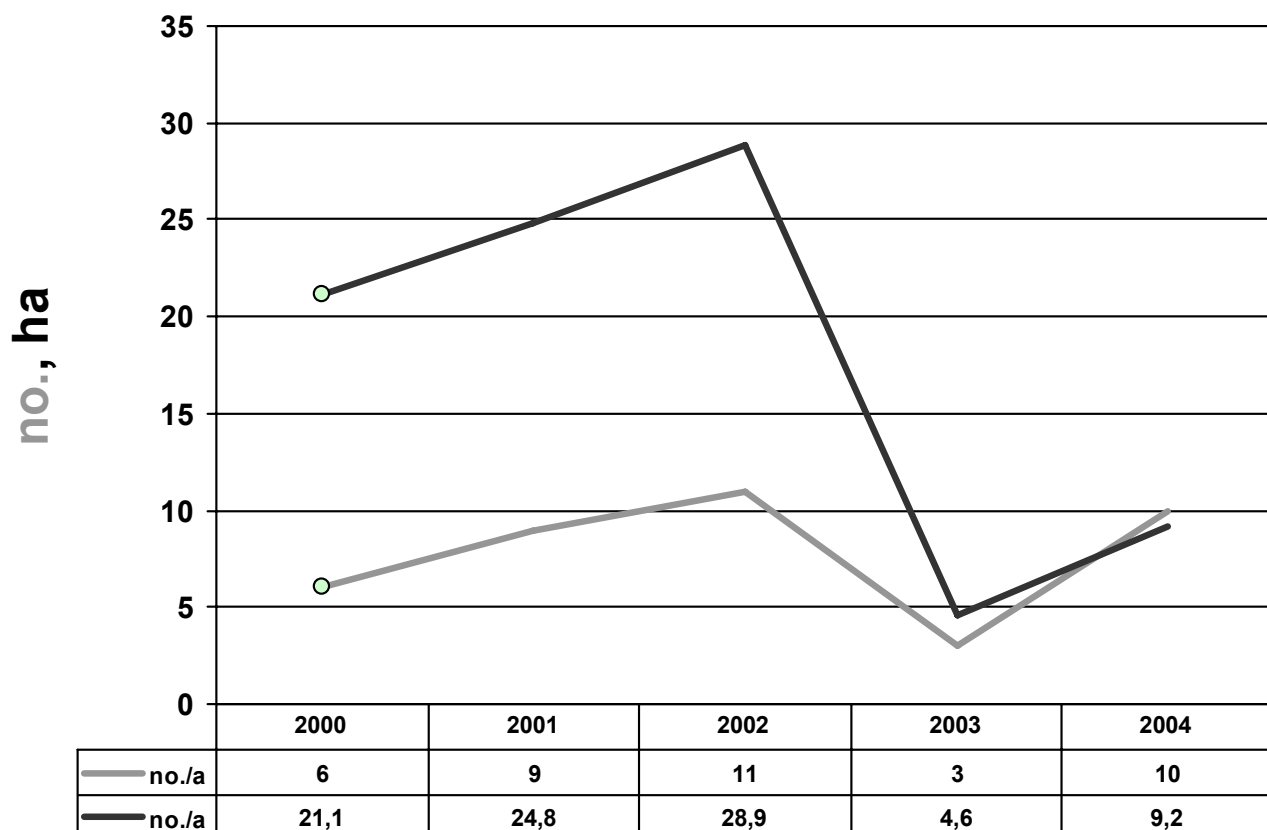


Source: TE Centre for Southeast Finland

Evaluation: The number of contracts concerning special measures of agri-environmental support has increased constantly during the period investigated, with the exception of 2000 when some of the contracts expired after the first five-year term of agreement. However, the number of contracts began to increase the following year, after which the trend has pointed upwards. Examined by the type of contract, the number of biodiversity contracts has grown the most in recent years, whereas new landscape management contracts have been few. A similar trend can be observed in the hectares covered by the contracts. Since 2001, the areas covered by landscape management contracts have decreased, whereas the area covered by traditional biotope and biodiversity contracts has grown.

Farmers view the biodiversity contracts as the most attractive alternative. The amount of support received through landscape management contracts is lower compared to the biodiversity contracts. Traditional biotope contracts are the type of contract least applied-for.

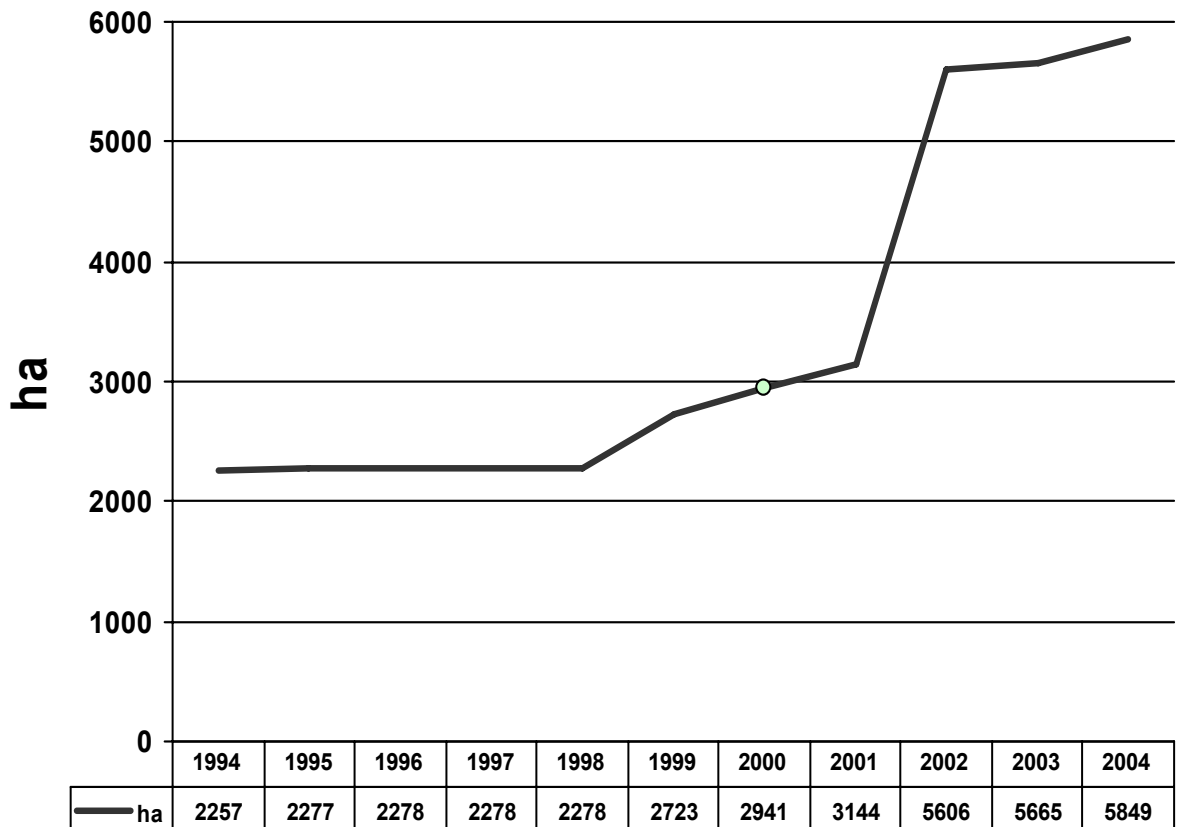
As a whole, the development trend for this indicator during 2000–2004 can be interpreted as **positive**.



Source: Forestry Centre Southeast Finland

Evaluation: Due to the short-term availability of forestry-related indicator time series, development trends cannot be predicted according to the data available.

Because an accurate evaluation cannot be made for the development trend of this indicator based on the statistics currently available, the evaluation for 2004 will remain **neutral**.

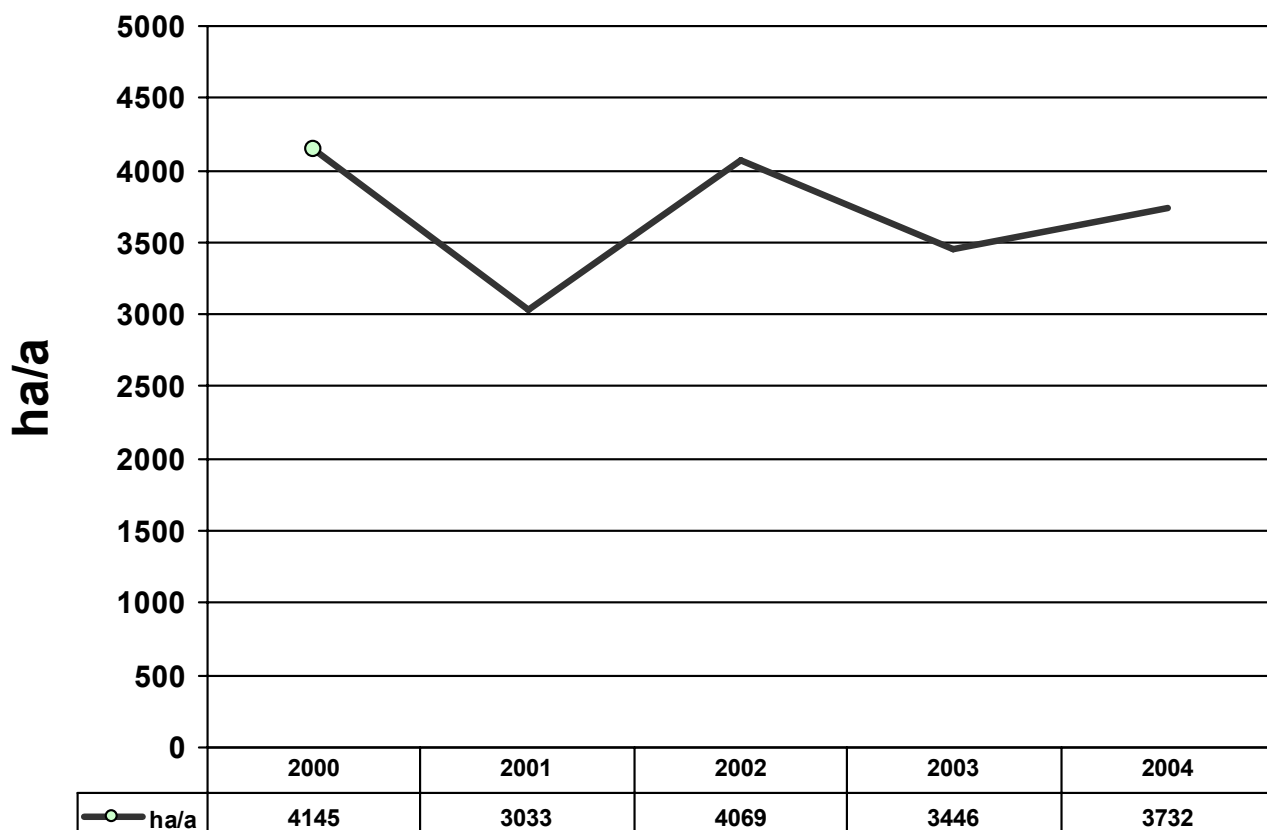


Source: Southeast Finland Regional Environment Centre

Evaluation: Here, the individual high peaks are the result of the realisation of long-term plans for larger conservation areas: e.g., the sales of lands to be incorporated into the Valkmusa National Park under the auspices of the Munasuo land redistribution project in 1999, the protection of the bird-rich waters of Tyyslahti and the Rajasuo bog area in 2000, the completion of the protection of the Rajasuo area and of the Munasuo land redistribution project in 2001 and, finally, the highest peak in the total area of protected areas is seen with the realisation of the Repovesi area in 2002, when a land donation by forest company UPM-Kymmene facilitated the establishment of the Repovesi National Park and the *Aarnikotkan metsän luonnonsuojelualue* conservation area (“Griffin Nature Conservation Area”). Furthermore, all the sites planned for conservation by another large company, Tornator, were implemented at once, which created a relatively large conservation area in Pyhtää (Saarela). In the future, the kinds of acquisitions of conservation areas and establishment of private conservation areas shown in this statistic will level out, because the largest projects have already been realised. A few more waterways will be protected as bird sanctuaries (an example of such projects was the Heinälahti lake in 2004).

The established conservation areas currently shown in statistics only represent a part of the implementation of the nature conservation programme. In addition to the ones recorded, the regional environment centre and the state forest administration (Metsähallitus) are acquiring conservation sites for state ownership. To date, only a small proportion of such sites have been established as conservation areas.

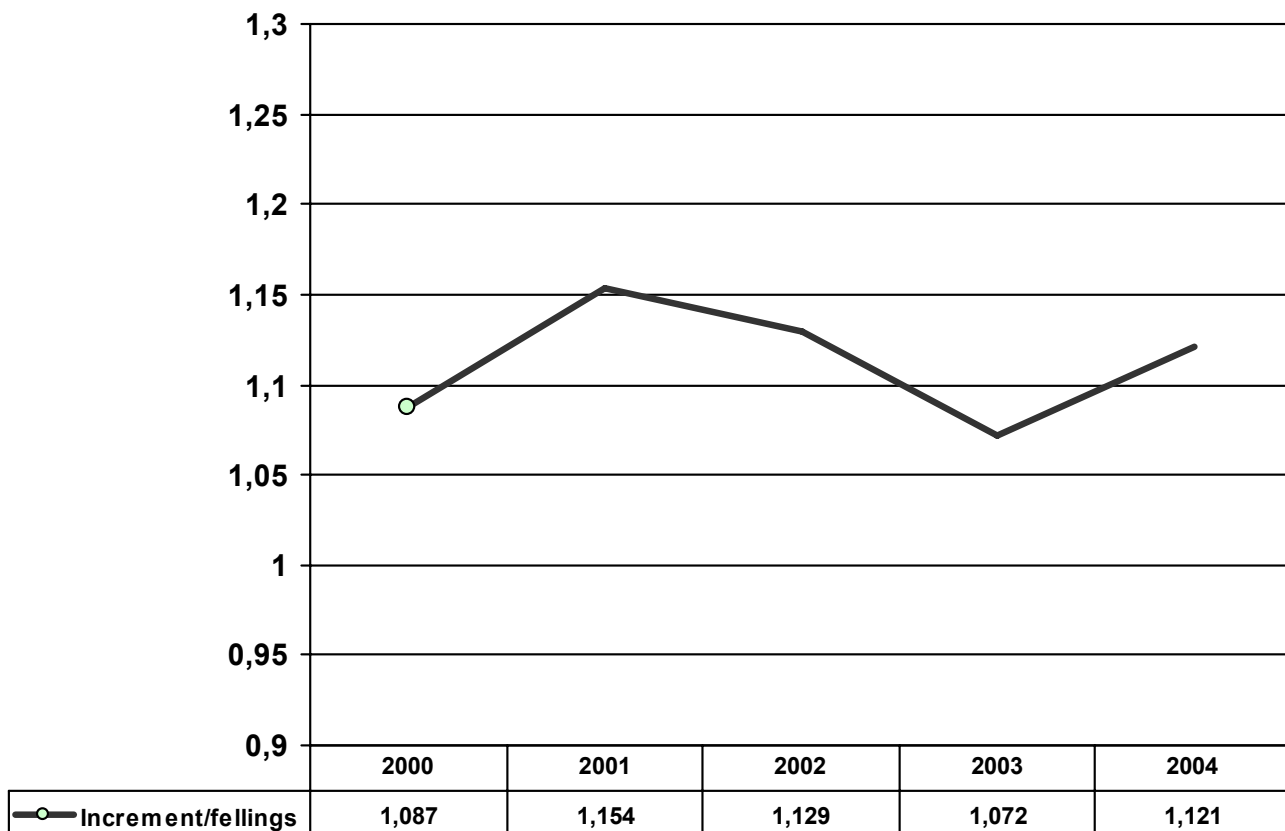
Due to the measures described above, the number of conservation areas was still showing strong growth between 2000 and 2004. This is why the development trend for this indicator during the period in question was clearly **positive**.



Source: Forestry Centre Southeast Finland

Evaluation: The number of regeneration fellings varies from one year to another. During a three-year period of investigation, the most timber was felled in 2000. The regeneration areas for 2001 and 2002 have been extracted from regional statistics, whereas the figure for 2000 is an estimate based on the total area of regeneration fellings in all of Southeast Finland and should, therefore, be regarded with caution. Due to a new statistics procedure, real future developments can be monitored quite accurately.

The absolute number of regeneration fellings in 2004 was roughly 10% lower than in 2000. However, because of the form and range of variation of the time series, an accurate trend cannot be determined at this point, which is why the development trend for this indicator during 2000–2004 is to be considered **neutral**.



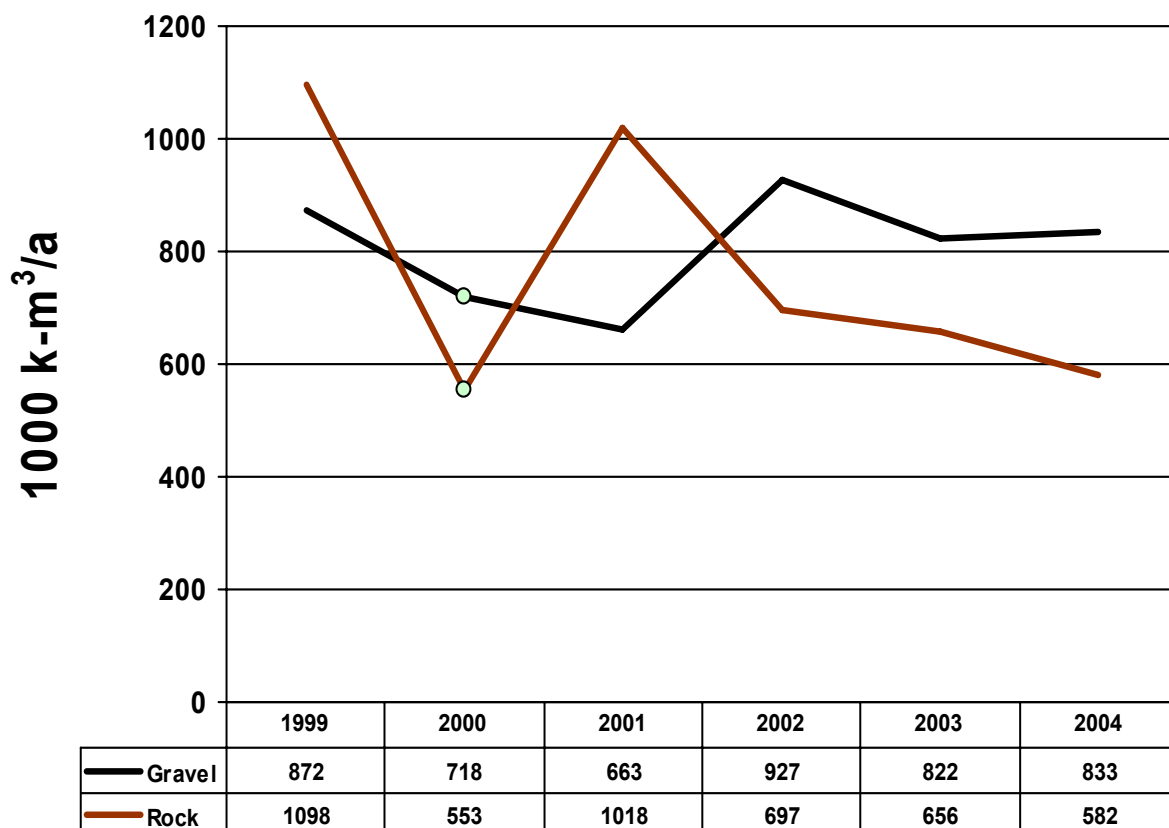
Source: Forestry Centre Southeast Finland

Evaluation: The development of the growing stock of forests is calculated by dividing the annual increment of growing stock by the annual felling removal, which means the volume of roundwood removed from the forests in one year. The felling removal is a sum of three factors: commercial fellings, cutting of firewood for households and contract sawmilling (i.e., household timber sawn by independent sawmilling contractors).

The data on regional commercial fellings is based on annual quantities of commercial fellings by municipality, which are then used to determine regional sums. The volumes of firewood for single-family houses have been derived from the latest survey of single-family house firewood consumption by summing up municipal estimates into regional ones (2001–2004). The figure for 2000 is based on the regional results from the second but latest survey of single-family house firewood consumption. The data for contract sawmilling has been derived from the figures concerning the Forestry Centre of Southeast Finland presented in the survey of small sawmills, and these figures have been subdivided by the ratio of forestry land areas.

The ratio of fellings in relation to growing stock increment describes the sustainability of the use of forest resources. If the figure remains above one, forests are growing more than they are being felled. If the ratio should reverse to less than one, the use of forests exceeds the limits of sustainable use. In Kymenlaakso, this ratio has so far remained on a sustainable footing.

The development has remained steady, and the development trend for 2000–2004 was **neutral**.

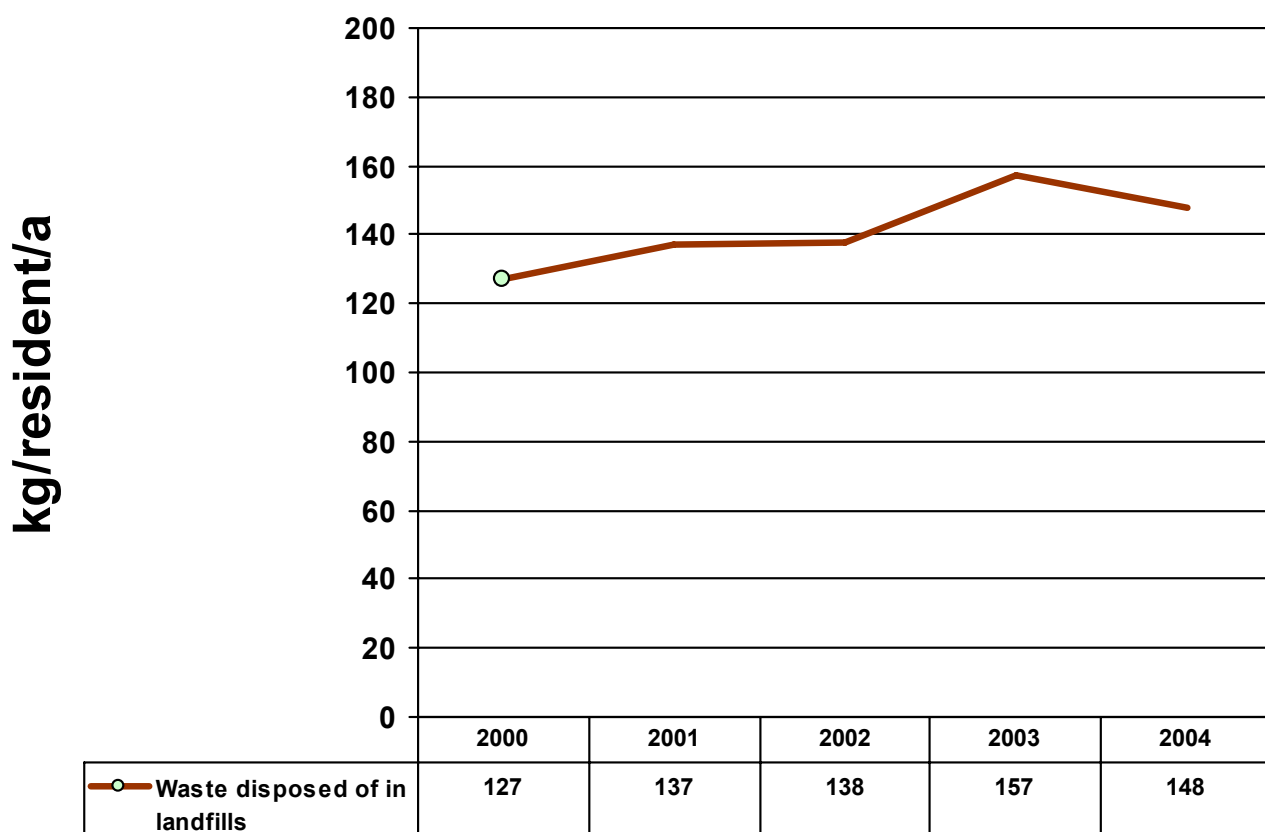


Source: Finnish Environmental Institute (SYKE)/MOTTO

Evaluation: The value for this indicator is the sum of gravel and rock extracted. Municipal data on gravel and rock extraction is compiled into the annual publication on extractable land resource volumes and permits (*Maa-ainesten ottomäärät ja ottamislupatilanne*, SYKE).

The volumes of gravel and rock extracted declined during 2000. The following year, however, the total volume of land resources extracted clearly increased due to the high volume of rock extracted. The results demonstrate that the annual extraction of rock varies more than that of gravel, and it is precisely the variation in rock extraction volumes that is reflected in the value fluctuations of this indicator.

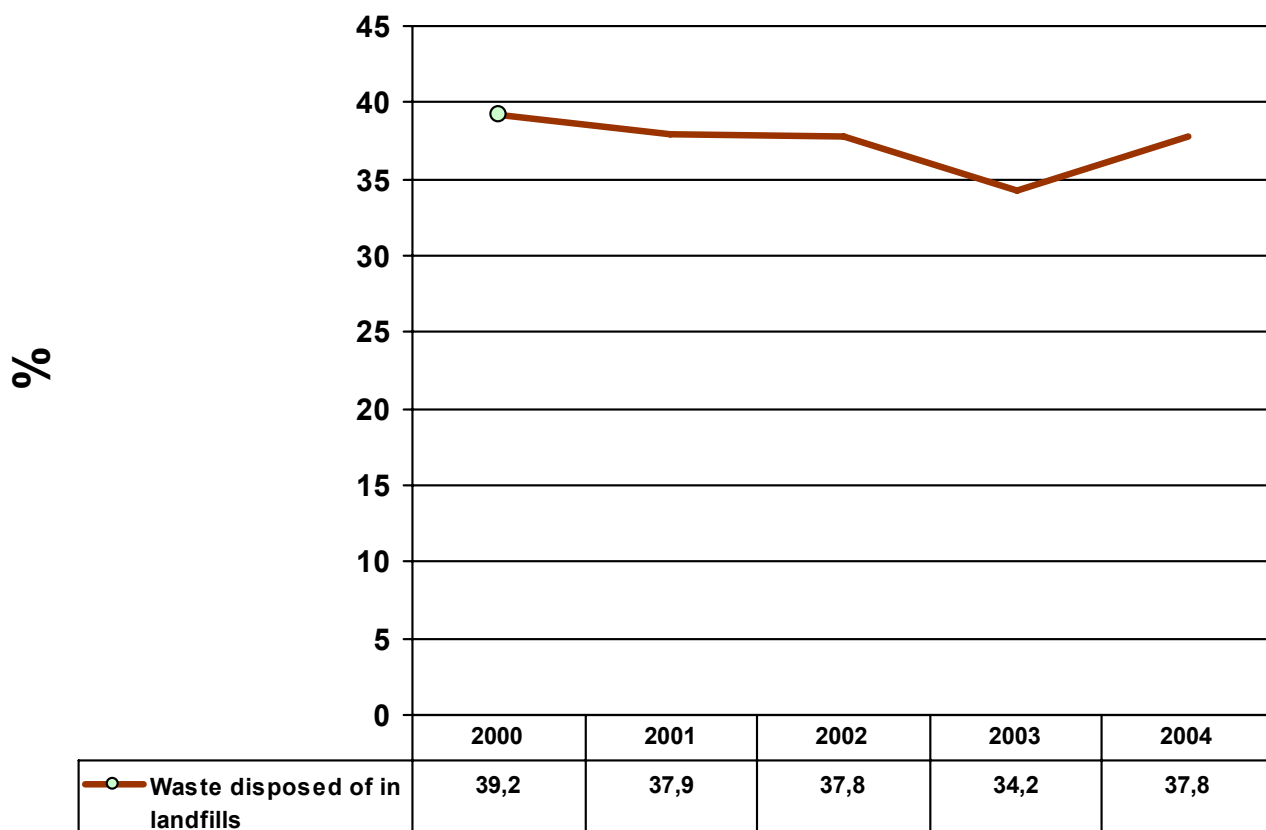
Due to the form and range of fluctuation of the time series, a clear trend cannot be determined at this point, which is why the development trend for 2000–2004 can be assessed as **neutral**.



Source: Kymenlaakson Jäte Oy, VAHTI

Evaluation: The value for this indicator is derived by calculating the sum total of all ordinary household waste disposed of in landfills and dividing the sum by the number of residents in the region. The figure does not include hazardous waste, sewage sludge, construction and demolition waste or excess soil.

This indicator shows an approximately 17% increase. However, the calculation method for the indicator still entails notable ambiguities, which is why the development trend for 2000–2004 is deemed **neutral**.

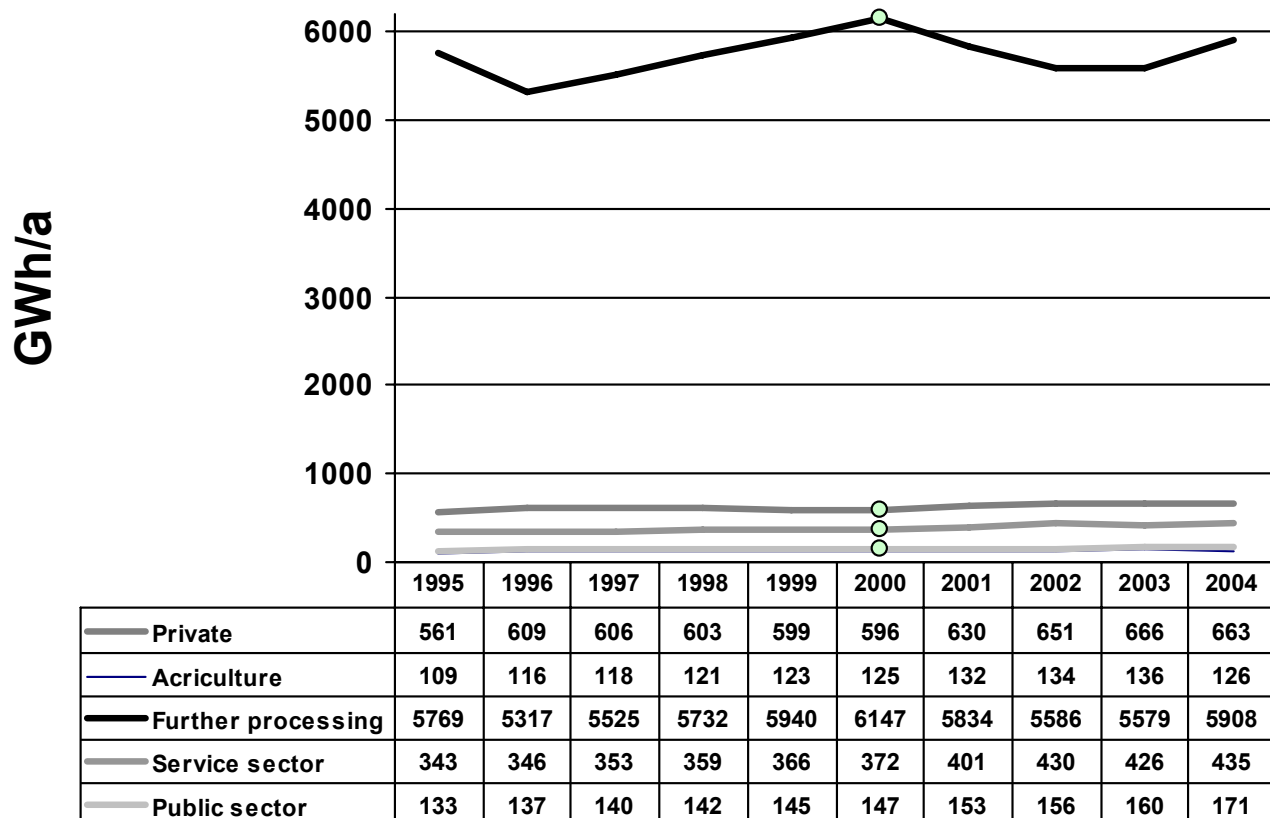


Source: Kymenlaakson Jäte Oy, Suomen Uusioaines Oy, VAHTI

Evaluation: The annual statistics maintained by regional waste recovery operators and, for waste paper and board, the Paperinkeräys Oy company, are used in determining the recovery rate of municipal waste from households. The recovery rate is derived by dividing the volume of waste recovered by the total volume of waste generated. The total volume of waste generated refers to the sum of the volume of waste disposed of in landfills and that of waste recovered.

Due to the statistical methods used, the volume of household waste disposed of in landfills has remained on the level of 130–160 kg/resident and the recovery rate determined as described above on the level of 81–89 kg/resident/a throughout recent years. During 2000–2004, the recovery rate of waste has been roughly 34–39%.

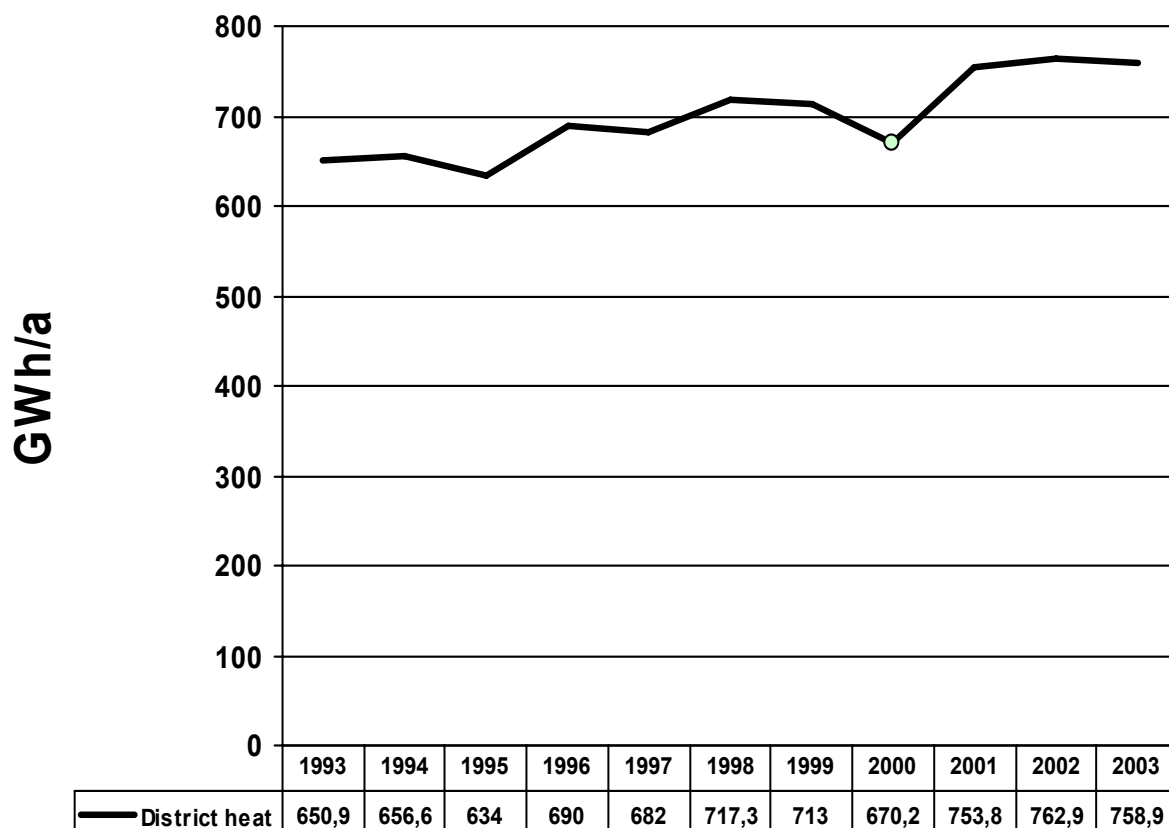
The calculation method for this indicator requires further development, but based on the data and calculation method available, the development trend for the indicator between 2000 and 2004 can be assessed as having been **negative**.



Source: Adato Oy

Evaluation: The figures for electricity consumption include private, agricultural, further processing as well as service and public sector consumption for each year. Regional consumption data have been obtained from the annual report *Electricity and District Heat* by Adato Oy.

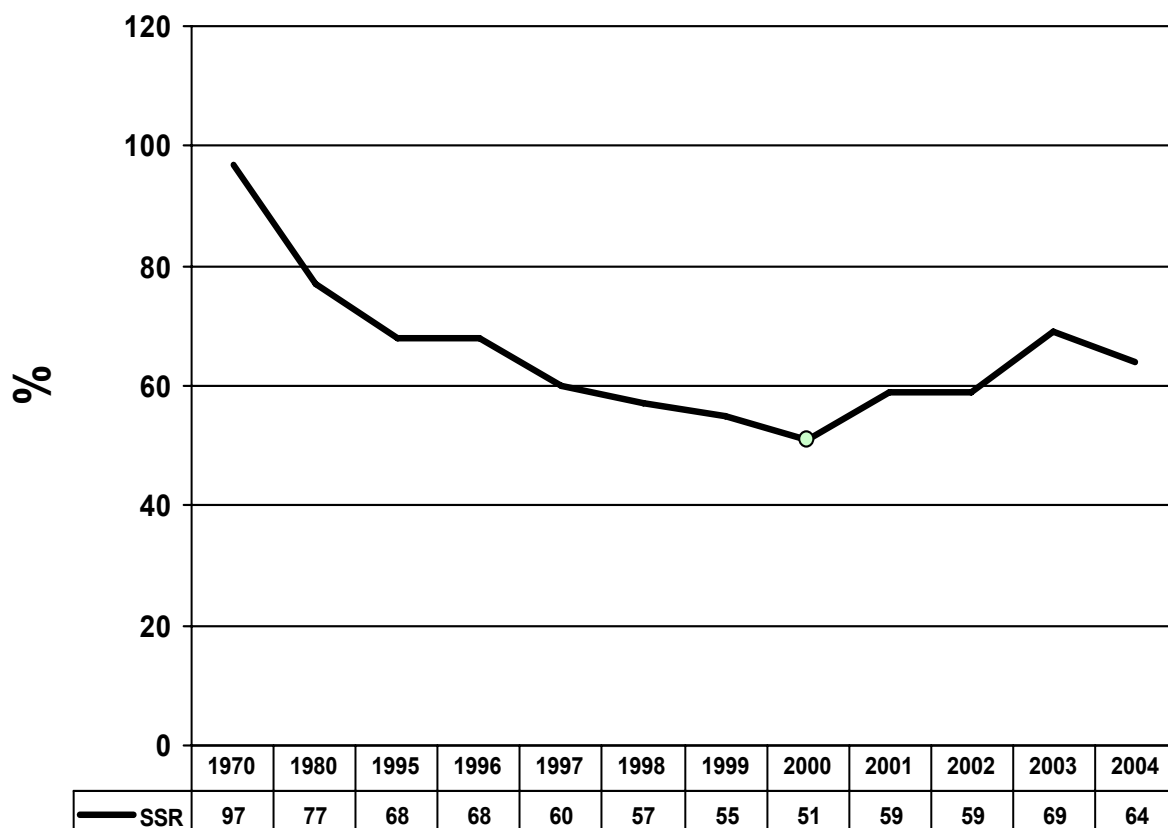
Electricity consumption figures are dominated by the large share of the further processing industry in the overall consumption—there the consumption has remained relatively steady, with the exception of the peak in 2000. On other sectors, electricity consumption has shown a steady increase. The consumption of electricity is related to several impact categories of the impact analysis, and the purpose here is not yet to comment on the significance of the increase in electricity consumption as an environmental indicator. Therefore, the development trend for 2000–2004 is considered **neutral**.



Source: Finnish District Heating Association

Evaluation: District heat consumption data have been obtained from the Finnish District Heating Association. The consumption of district heat has increased steadily during the 21st century in parallel with the number of households joining the district heating network. In Kymenlaakso, the highest increase in consumption has occurred for Kotka Energy Ltd.

The increase in district heat consumption may have been caused by the heating solutions of new construction or the joining of buildings which have previously been heated by individual solutions into the district heating network. Small-scale burning of various fuels in separately heated buildings causes significantly more environmentally adverse smoke gas emissions than the production of district heat. However, the statistics used do not reveal in which sector the increase in district heat consumption has been the most intense. Based on the above, the trend for the consumption of district heat as an environmental indicator during 2000–2004 can be evaluated as **neutral**.



Source: Adato Oy

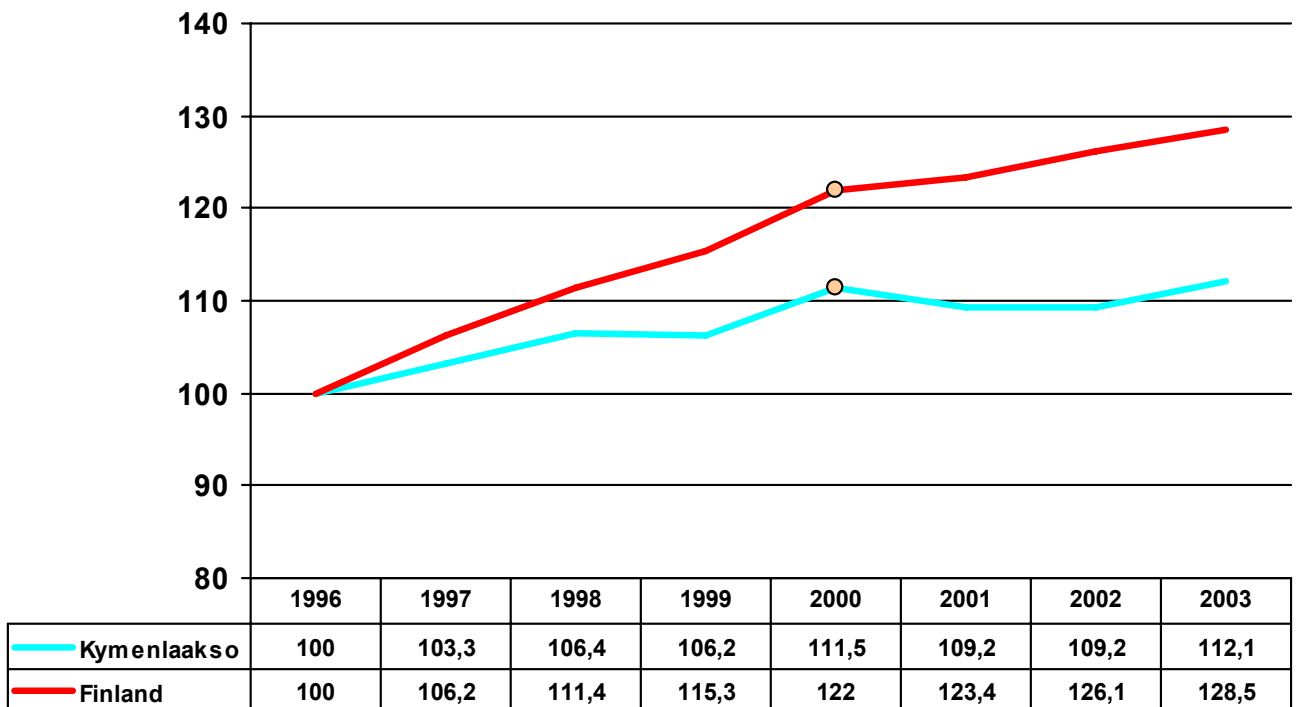
Evaluation: The self-sufficiency of energy production is derived by determining the amount of energy produced within the region. In connection to this project, a self-sufficiency rate has been determined for 1970, 1980 and 1995–2003.

In Kymenlaakso, the self-sufficiency rate of energy production has declined between 1970 and 2003 from near complete self-sufficiency to just over 30%.

Energy consumption is related to several impact categories of the impact analysis, and the purpose here is not yet to comment on the significance of the development in self-sufficiency as an environmental indicator. Therefore, the trend for this indicator for 2000–2004 is considered **neutral**.



Volume index of value added/Value added at the prices of 2000, 1996 = 100



Source: Statistics Finland, regional accounts 19 Apr 2005

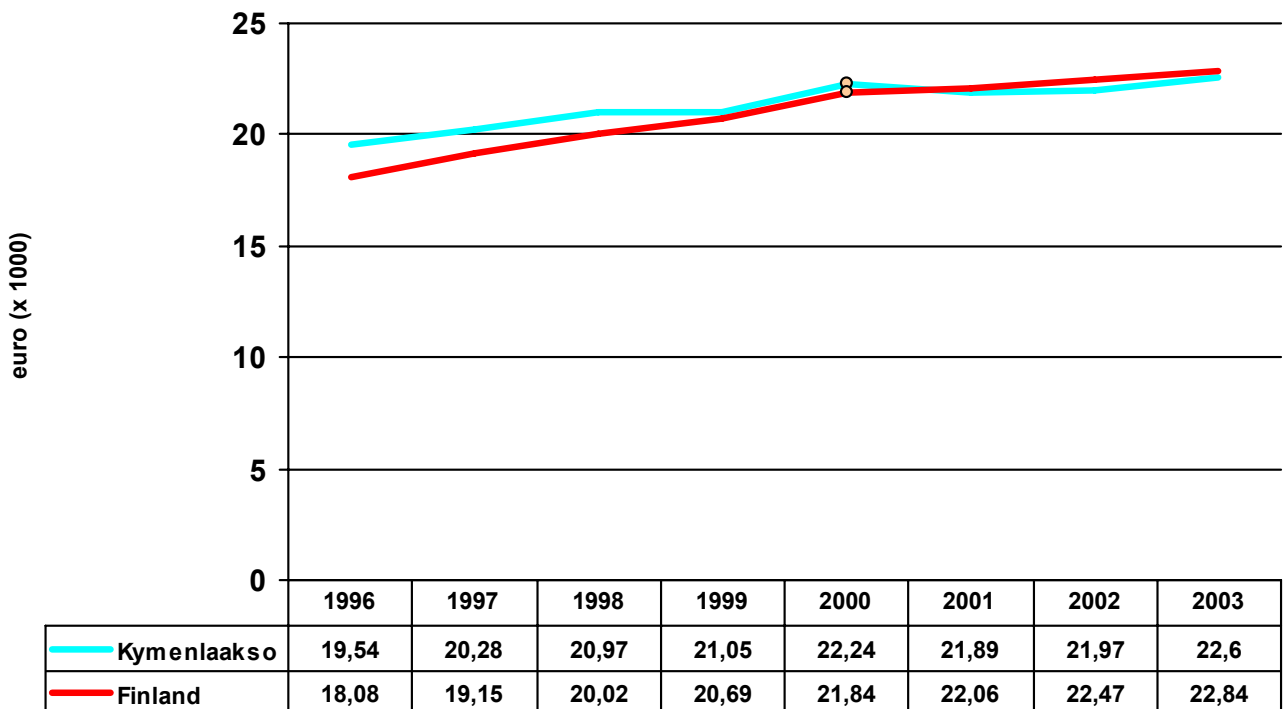
Evaluation: The regional economy of Kymenlaakso grew at the beginning of the period under investigation, recessed during 1999–2002, and began to grow again towards the end of the period.

The slump in economic growth during 2000 was caused by the weak trend in forestry. On average, growth has been slower than in Finland as a whole.

*Value added: *Value added measures the new value created by economic activity. Gross domestic product at market prices (GDP) is the most commonly used measure of the economic activity of the overall economy. It is obtained by adding product taxes to the value added and then subtracting product subsidies.*



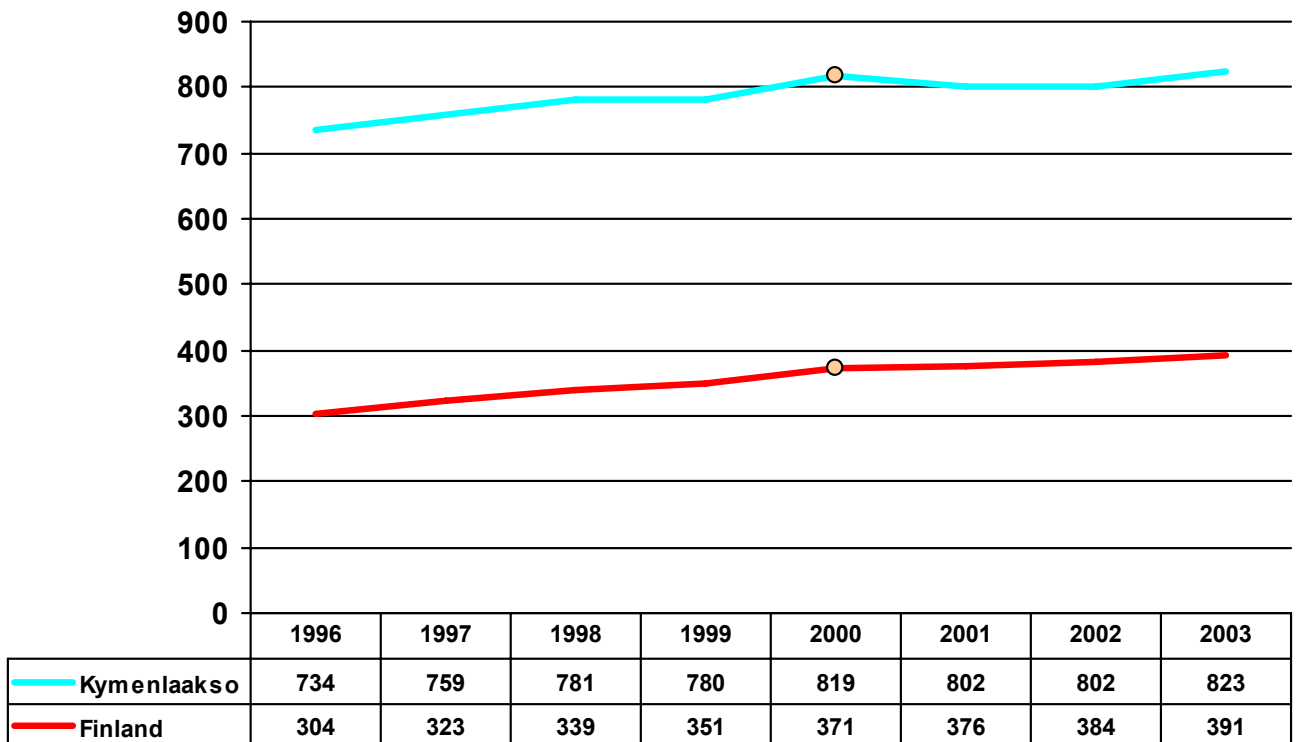
Value added per capita in Kymenlaakso, euro (x 1000). Value added at the prices of 2000.



Source: Statistics Finland, regional accounts 19 Apr 2005

Evaluation: The value added per resident was somewhat higher in Kymenlaakso than in all of Finland at the beginning of the period under investigation, whereas it dropped slightly lower than the national average towards the end of the period.

The volume and development trend of value added per resident has remained similar in Kymenlaakso to that of Finland as a whole.

Value added per area in Kymenlaakso, euro/km² (x 1000)

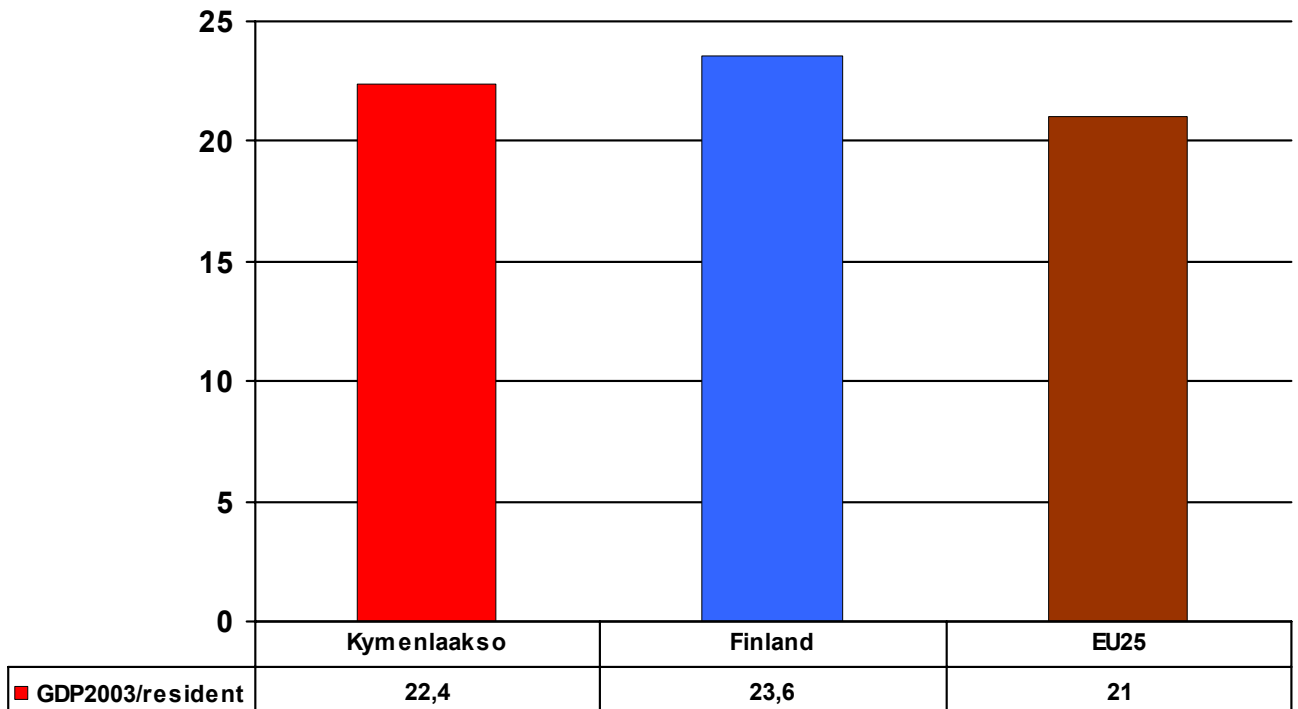
Source: Statistics Finland, regional accounts 19 Apr 2005

Evaluation: The value added per area is notably higher in Kymenlaakso than in Finland on average.

The development trend for value added per area has been similar in Kymenlaakso to that of Finland as a whole.



GDP in 2003 per resident in Kymenlaakso, Finland and the EU25 countries,
euro (x 1000)



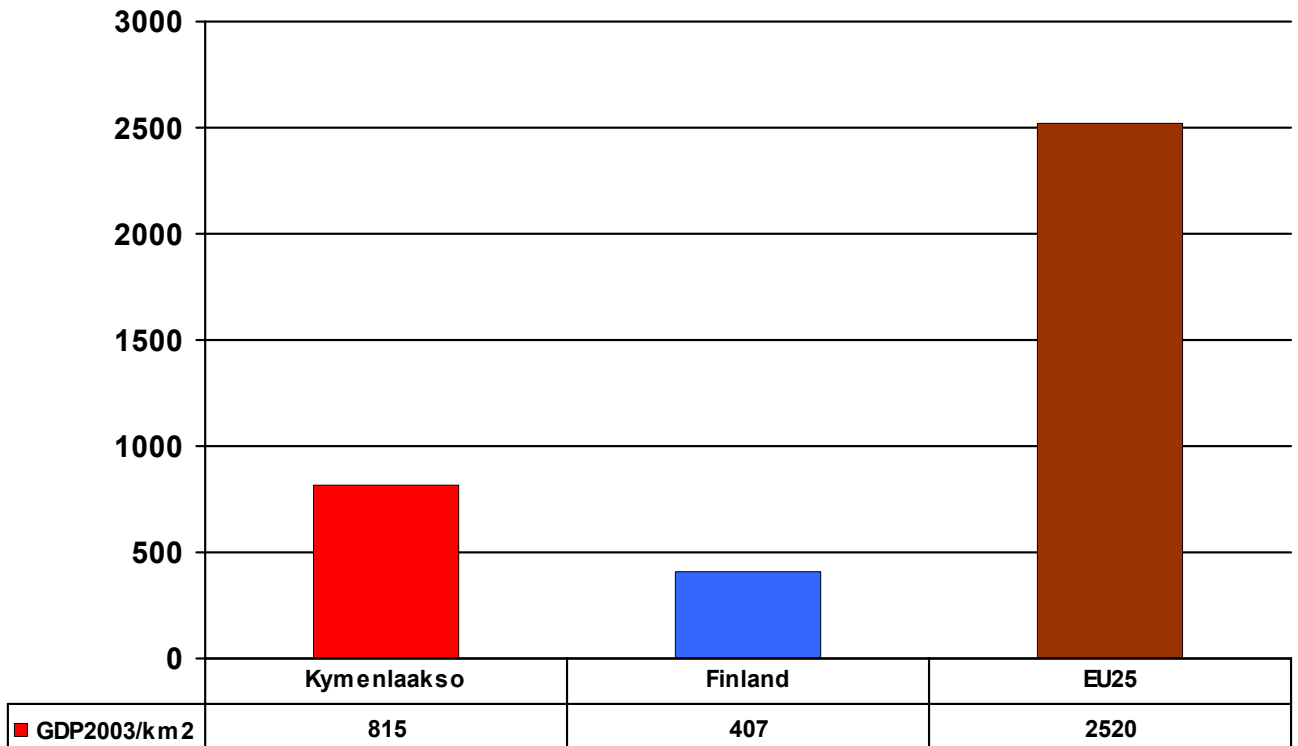
Source: Annual national accounts, population statistics

Evaluation: In Kymenlaakso, the GDP calculated per resident is lower than the Finnish average but significantly higher than the EU average.

The development trend and the relationship between various areas have not changed significantly in recent years.



GDP in 2003 per area in Kymenlaakso, Finland and the EU25 countries



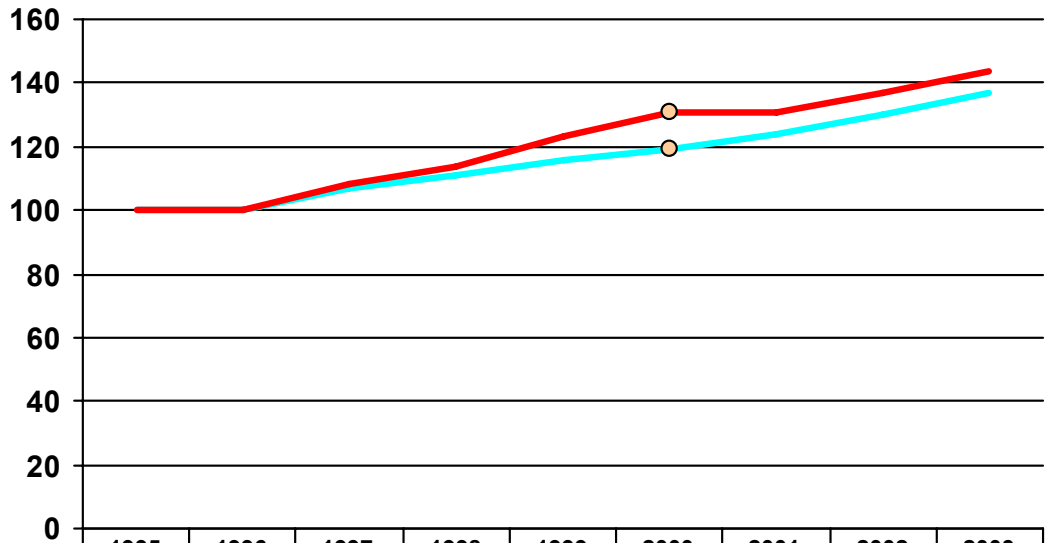
Lähde: Annual national accounts, National Land Survey of Finland

Evaluation: In 2003, the GDP calculated per area for Kymenlaakso was approximately double compared to the Finnish average but merely roughly one-third of the EU average.

The development trends and the relations between various areas have not changed significantly in recent years.



Disposable income per resident, 1995 = 100

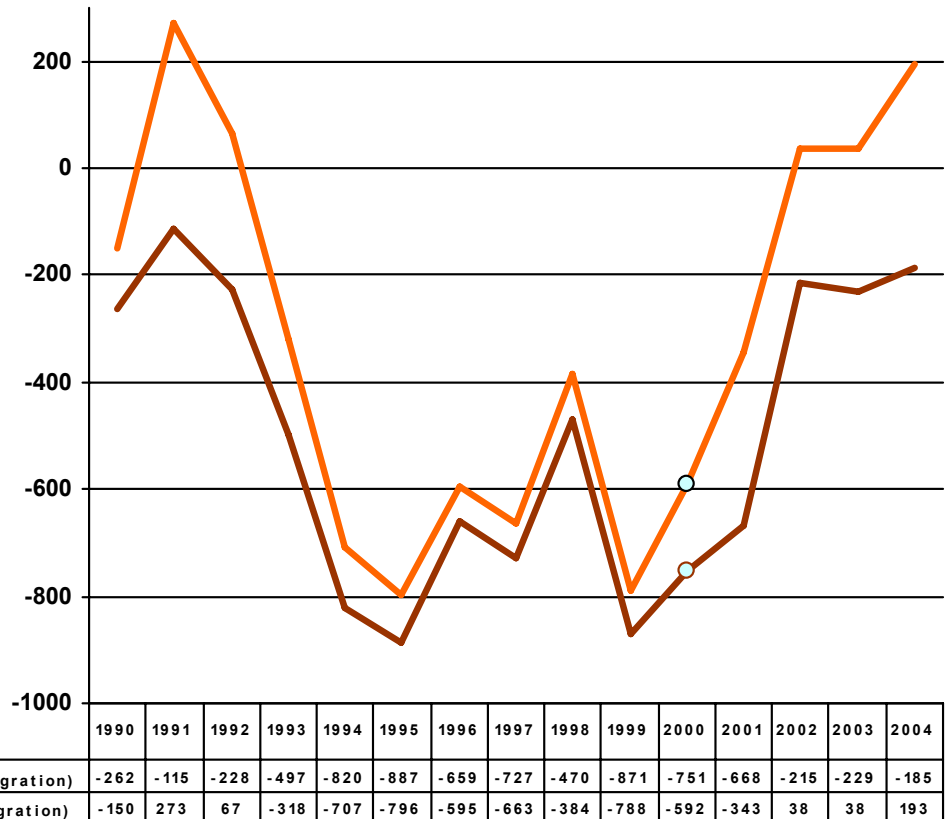


	1995	1996	1997	1998	1999	2000	2001	2002	2003
Kymenlaakso	100	100	107	111	116	119	124	130	137
FINLAND	100	100	108	114	123	131	131	137	144
Kymenlaakso (euro)	9993	10027	10719	11068	11590	11899	12440	13037	13703
Finland (euro)	9715	9731	10508	11040	11940	12760	12755	13339	13986

Source: Statistics Finland, regional accounts 8 Jun 2005

Evaluation: In Kymenlaakso, the disposable income per resident has grown throughout the period under investigation.

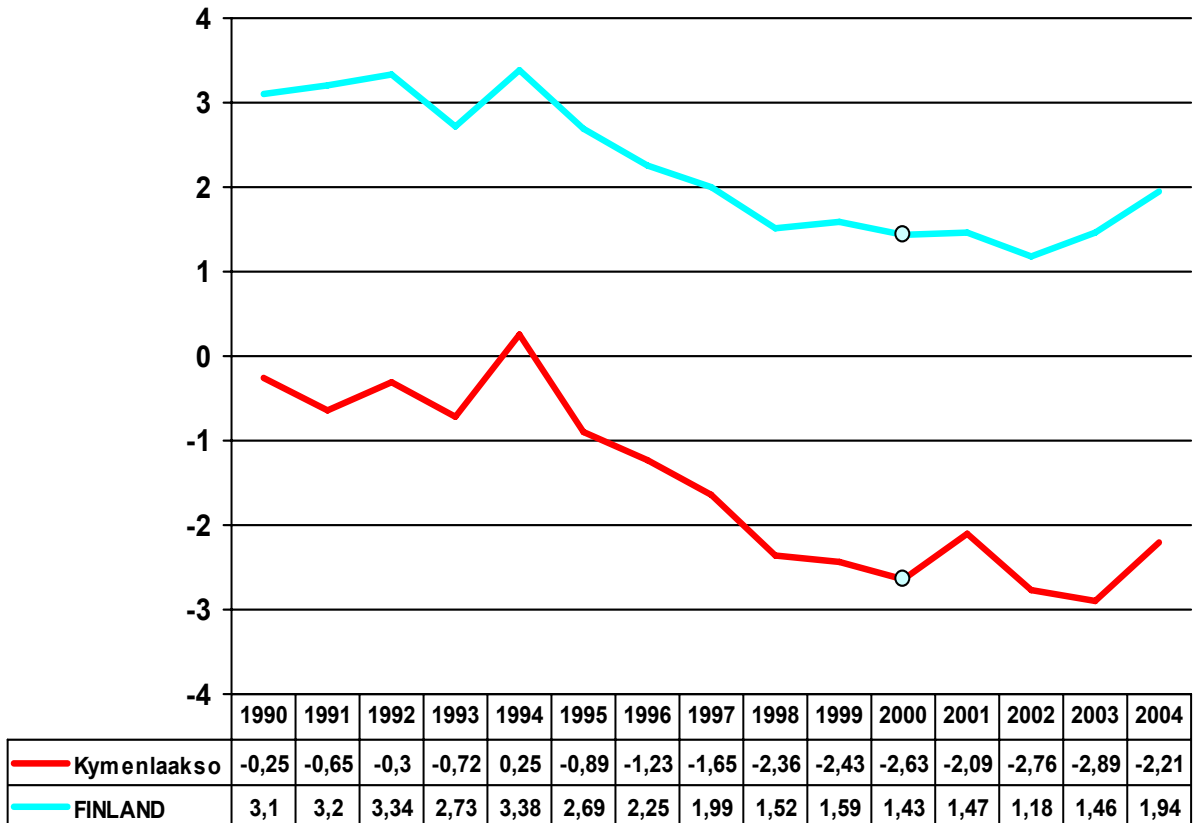
On average, the disposable income per resident has remained on the same level in Kymenlaakso as in Finland as a whole.



Source: Statistics Finland, population statistics

Evaluation: Though the net migration to and from other parts of Finland is still negative in Kymenlaakso, the migration loss has diminished during the last five years. At the same time, immigration from abroad has increased the population: during the last three years, the population has increased through immigration more than it has decreased through internal migration losses. However, Kymenlaakso can mainly be categorized as a region losing working-age residents to other regions and not vice versa.

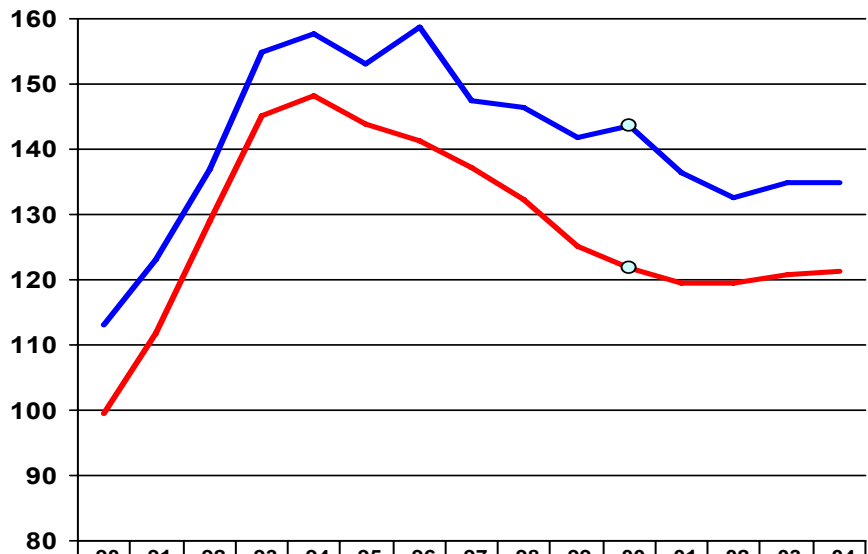
Connections to other phenomena and indicators: Net migration is influenced both by forces driving people away from the region and the attractions of other regions. Unemployment and estimates on employment opportunities concerning the sending region and, on the other hand, the employment conditions of the receiving region constitute a significant factor. Migration can also be accelerated by the perceived or estimated quality of housing and other services having to do with living conditions in the sending or receiving region. To a degree, migration also relates to the various phases of an individual's life: during the student years, for example, it is quite common for young people to move in search of new experiences and knowledge outside the immediate environment.



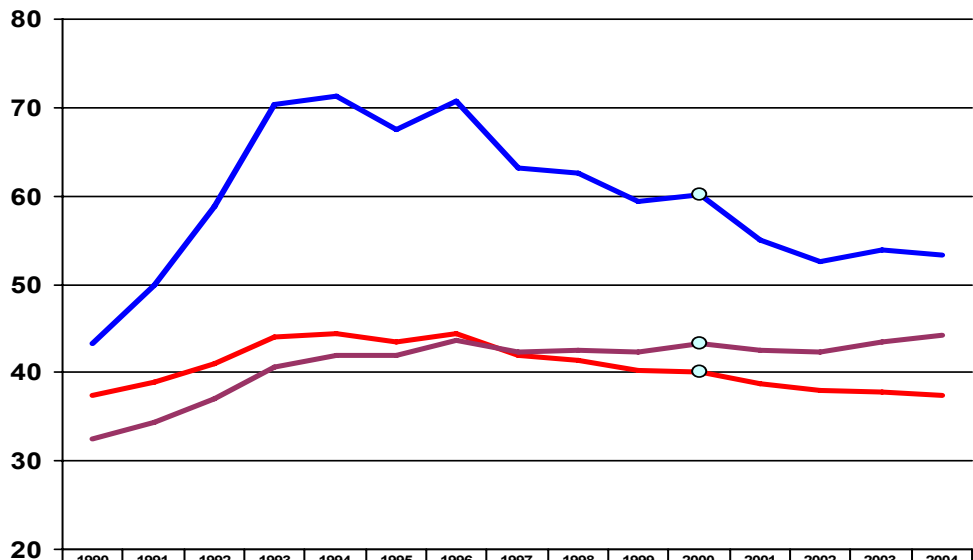
Source: Statistics Finland, population statistics

Evaluation: This indicator compares the number of births to that of deaths. Each year, there have been fewer births than deaths in Kymenlaakso. The number of deaths *per se* has not changed essentially—in fact, it has decreased during the last two years. However, the number of births per year showed a clear decline after 1994. In 1994, 2,169 children were born in Kymenlaakso, but by 2003 the figure had dropped by more than 500. In 2004, however, the number of births increased. In Finland as a whole, the number of births has remained higher than that of deaths throughout the fifteen-year period under investigation.

Connections to other phenomena and indicators: The numbers of births and deaths are especially impacted by the age structure of the population. However, the services and societal factors influencing the lives of young families most probably also yield their impact on birth rates. Furthermore, this indicator is naturally affected by the number of deaths occurring within the region. In addition to age structure, other regional factors may increase the number of premature deaths. In Kymenlaakso, the number of deaths before the age of 65 is higher than the national average—this, in turn, may be related to the health of the population, the number of accidents as well as the levels of subsistence and unemployment.



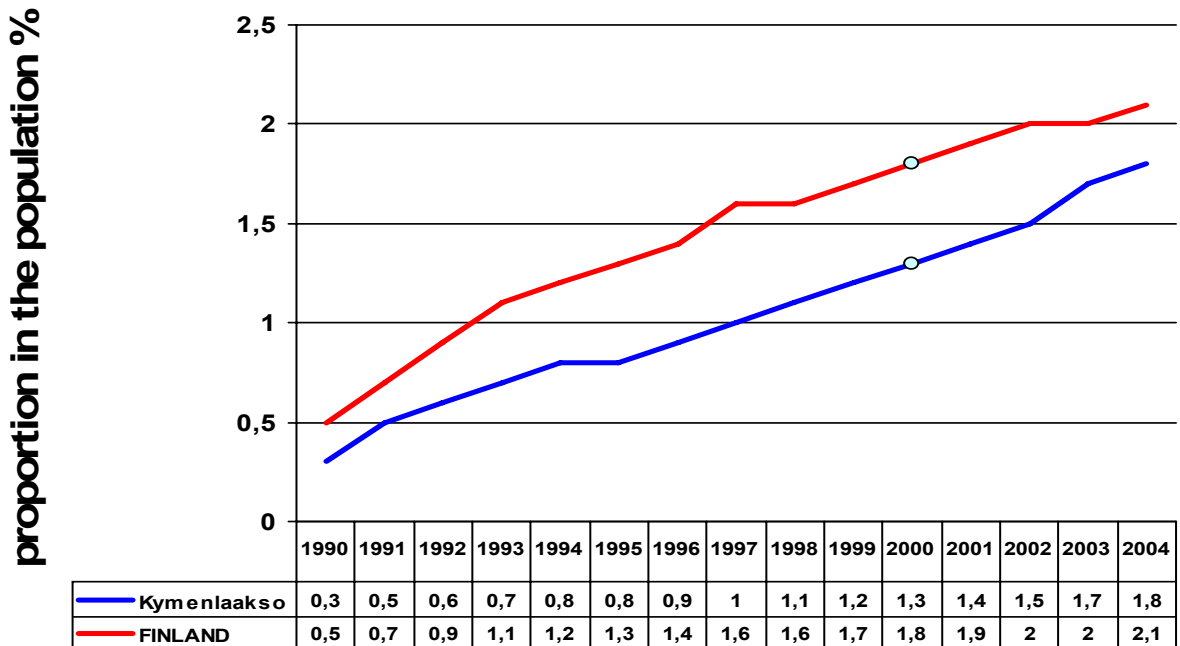
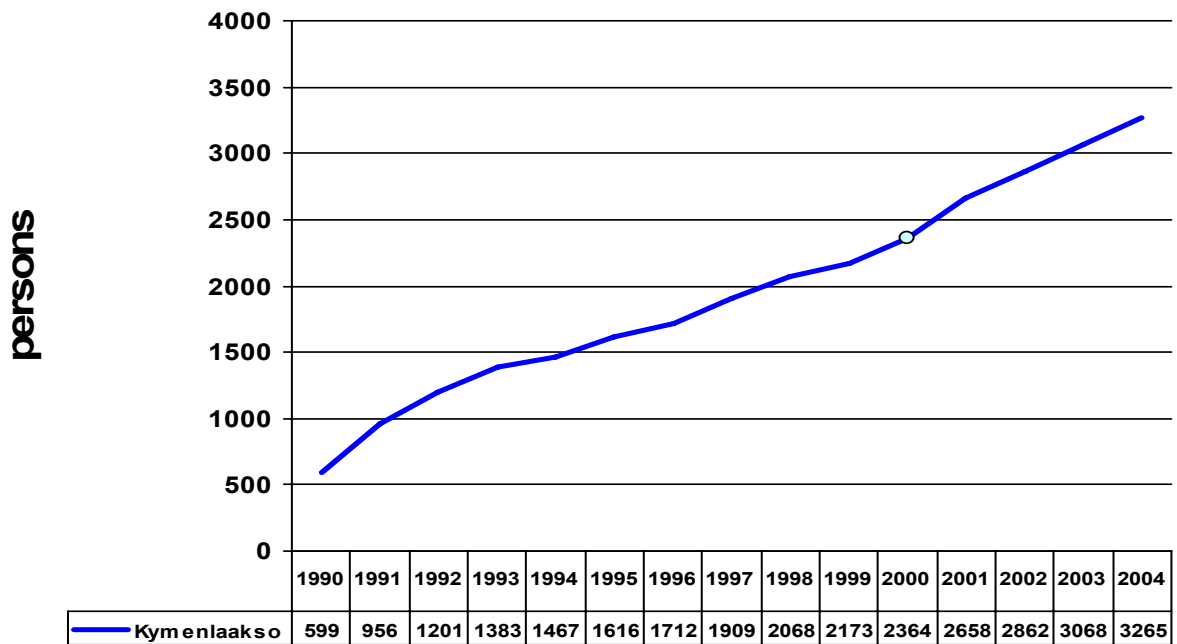
— Non-employed, Kymenlaakso	113	123	137	155	158	153	159	148	147	142	144	136	133	135	135
— Non-employed, FINLAND	99,6	112	129	145	148	144	141	137	132	125	122	120	120	121	121



— Non-employed, working age	43,3	49,9	58,8	70,4	71,3	67,6	70,8	63,1	62,5	59,3	60,2	55,1	52,5	53,8	53,3
— 0 - 14 years of age	37,4	38,9	41	44	44,4	43,5	44,4	42	41,4	40,2	40,1	38,8	37,9	37,8	37,4
— 65+ years of age	32,4	34,4	37	40,6	41,9	41,9	43,6	42,4	42,6	42,4	43,2	42,5	42,3	43,4	44,2

Source: Statistics Finland, population statistics and labour force survey (StatFin)

Evaluation: In Kymenlaakso, the dependency ratio is poorer than in Finland on average. This difference has grown since the depression of the 1990s, though it has levelled out some during the last few years. During the late 1990s, the number of those employed in Kymenlaakso grew notably more slowly than the national average, and the dependency ratio therefore did not begin to decline at the same rate as that of Finland as a whole. At the beginning of the 21st century, Kymenlaakso's dependency ratio did become lower and the difference to the national average was reduced. During the last two years, however, the dependency ratio has not declined any further. The number of children among those dependent on others for support has shown a gradual decrease, whereas the number of working-age people not included in the workforce has not.

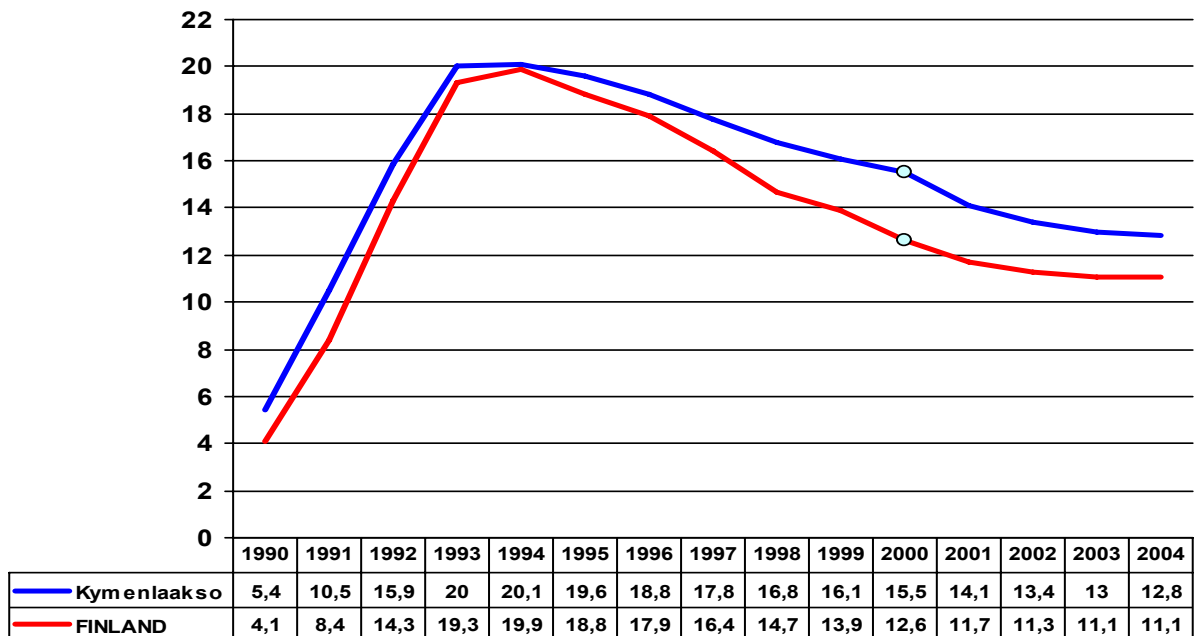


Source: Statistics Finland, population statistics (StatFin)

Evaluation: The number and proportion of foreign citizens in the overall population of Kymenlaakso has grown in a linear fashion. In the 21st century, the number of foreign citizens has grown more rapidly than in Finland as a whole on average. In fact, the proportion of foreign citizens in the overall population of Kymenlaakso has approached the national average: in 2004, the proportion of foreigners among Kymenlaakso residents was 1.8% and that of foreigners among the overall population of Finland 2.1%. In Kymenlaakso as well as the entire country, foreign citizens are concentrated in urban areas—in Kymenlaakso, this essentially means a few municipalities. At the end of 2004, the highest proportion of foreigners in Kymenlaakso were living in Kotka (1,407 persons) and Kouvola (797 persons), the percentage for both towns being 2.6% (5.2% in Helsinki). Virolahti and Hamina also had more foreign citizens as residents than Kymenlaakso on average.



Source: Statistics Finland

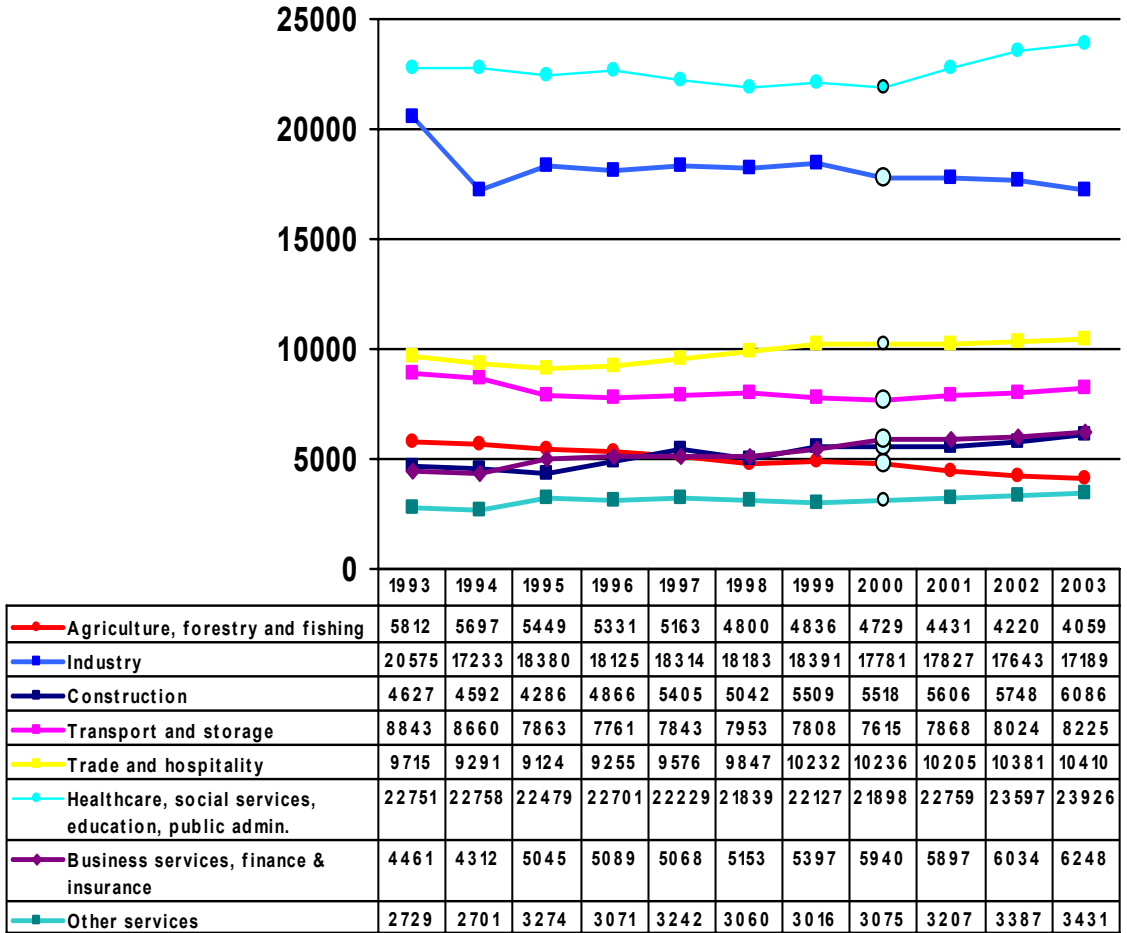


Source: Ministry of Labour

Evaluation: In Kymenlaakso, unemployment is a more severe problem than in Finland on average. Measured in unemployment rates, the developments in the regional labour market during the early 1990s and the 1990s depression were in line with the average development in Finland, and the level of unemployment was also not essentially different. However, Kymenlaakso fell behind the national average with regard to the post-depression decline in unemployment. While statistics by labour administration showed an unemployment rate of 19.9% for all of Finland in 1994, the corresponding figure for Kymenlaakso was 0.2 percentage points higher, 20.1%. In 2000, this difference was at its largest with a 2.9 percentage point difference. During the most recent years, unemployment has declined more rapidly in Kymenlaakso than in the country on average: in 2004, the regional unemployment rate was only 1.7 percentage points higher than the national average. However, unemployment is still a severe problem for Kymenlaakso, yielding a clear impact on the level of subsistence and psychological welfare of residents.



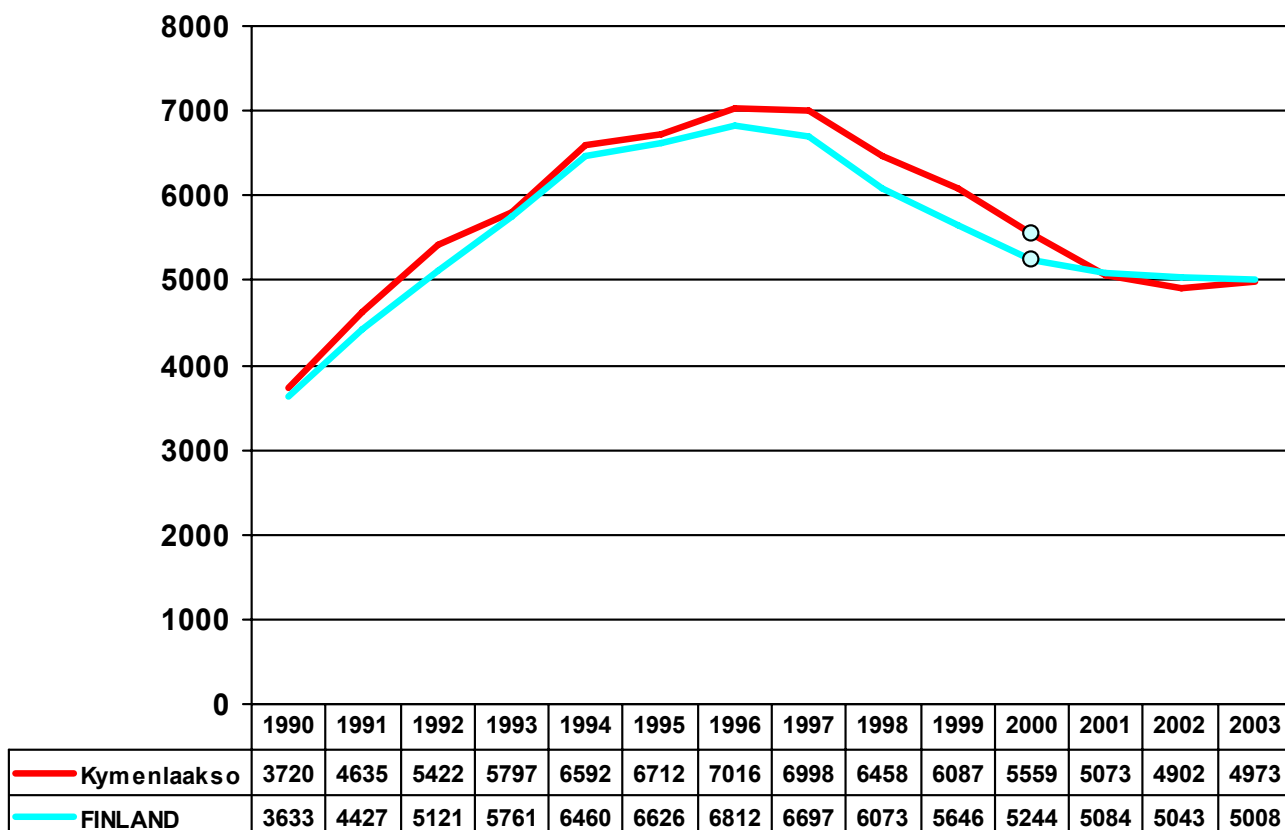
persons



Source: Statistics Finland, regional accounts

Evaluation: The job structure may influence the living conditions of the region's population in that, e.g., the differences in the opportunities offered by various sectors will become emphasised during the course of future developments. Jobs offered by industry are decreasing in numbers. The same development, albeit even more severe, is also familiar in agriculture. The structural changes of the various branches may disrupt the lives of the region's residents, unless people are able to cope with the changes or even become active in speeding up the development towards a positive direction for themselves and the various sectors of the labour market.

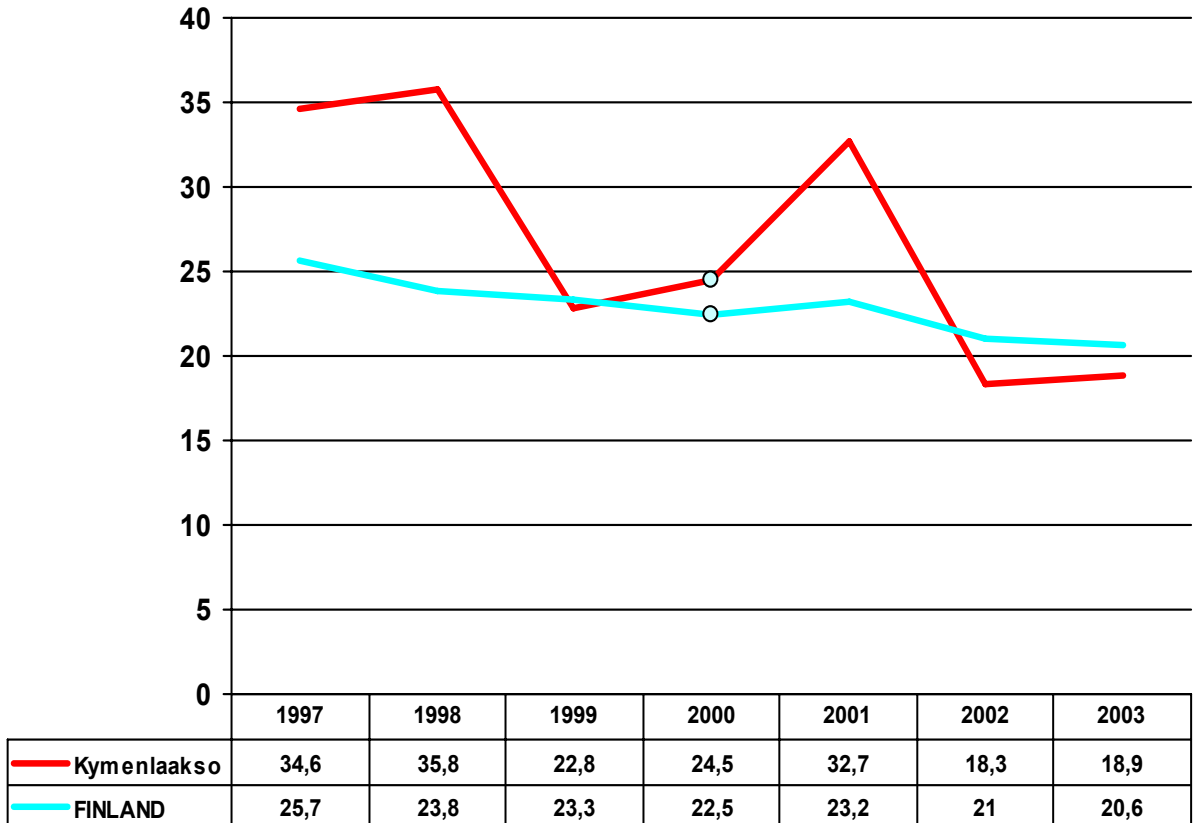
The quality of jobs also has a clear impact on the living conditions of the population. The jobs which remain after the changes as well as the new ones created should not only provide people with a satisfactory income, but also generate a sense of happiness and well-being.



Source: National Research and Development Centre for Welfare and Health (Stakes)

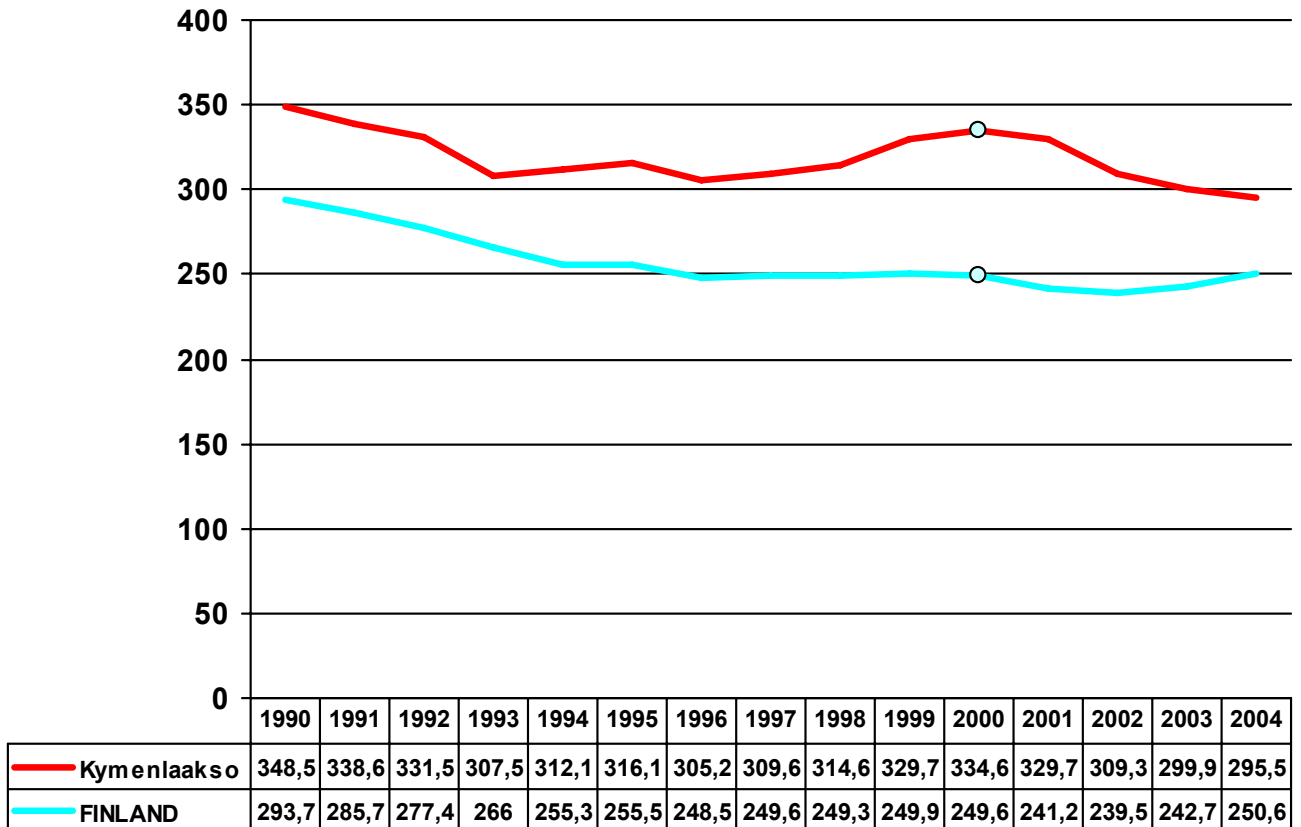
Evaluation: In 2003, social assistance was received by 9,233 households in Kymenlaakso. The relative proportion of households on social assistance remained somewhat higher in Kymenlaakso than in Finland on average up until 2001, after which the national average has been slightly higher. Dependence on social welfare grew after the 1990s' depression and had nearly doubled in 1996, compared to the level in 1990. During the latter half of the 1990s, the number of households receiving support declined more slowly in Kymenlaakso than in Finland on average. In the last few years, the figure has not continued to decline.

Connections: Dependency on social assistance is connected with, for example, employment and unemployment, income distribution and poverty. The graph describing those receiving social assistance corresponds quite closely with the one describing developments in unemployment. The main difference is that the peak in the number of households receiving social assistance occurred roughly two years behind the peak in unemployment. Another difference is perhaps the fact that the relative proportion of social assistance recipients in Kymenlaakso has dropped below the national average, even though the unemployment rate remains above the national average. No recent data or time series are available concerning the level of poverty. A statistic from 2001 mentions poverty rates of 5.9% for Kymenlaakso and 5.4% for all of Finland. At the time, however, the relative proportion of households receiving social assistance in Kymenlaakso was lower than the national average. A quick conclusion is that those living under the poverty line in Kymenlaakso cope slightly better without resorting to social assistance. After all, the need for assistance depends not only on the level of income but also on the costs of living.



Source: Statistics Finland

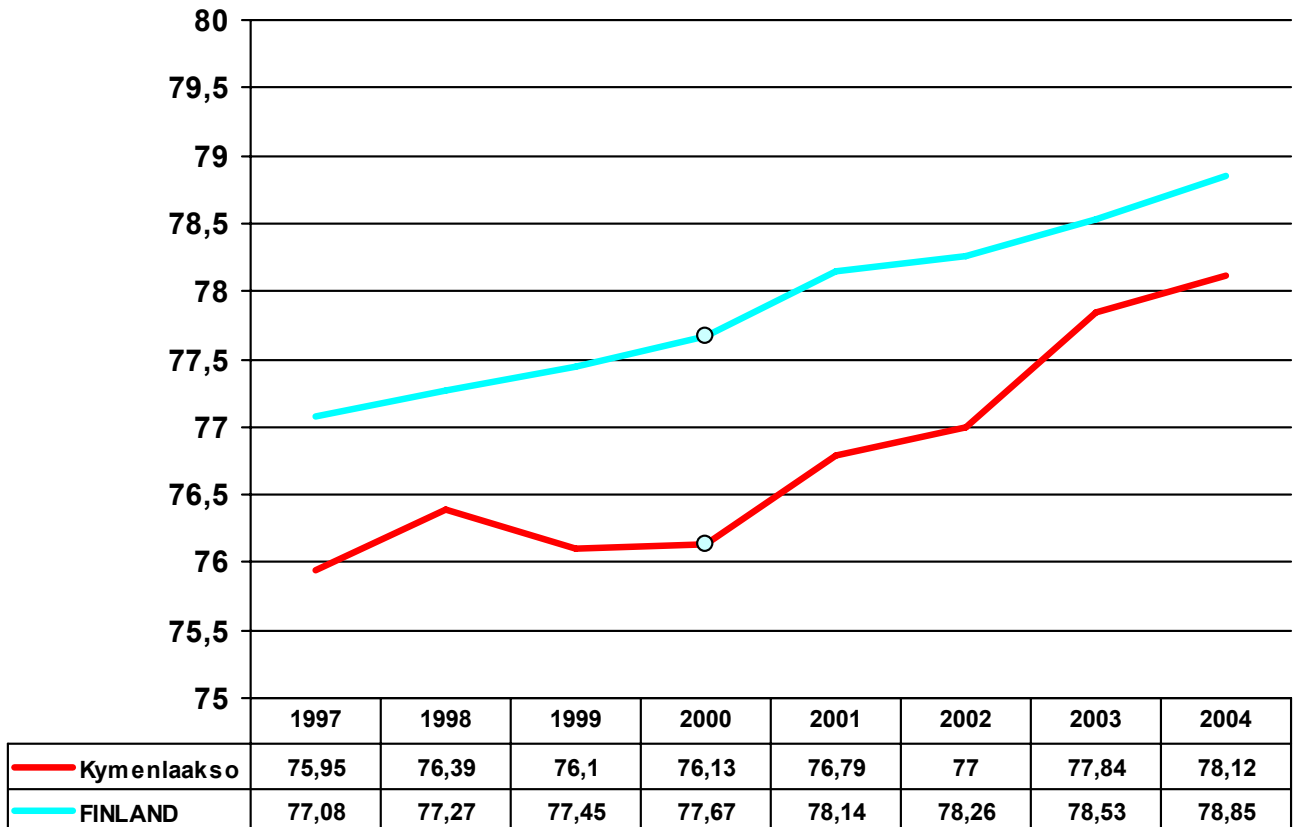
Evaluation: The number of suicides per year has fluctuated to quite an extent in Kymenlaakso. However, the trend has been declining. Another positive observation is that during the last two years presented in this graph, the figure dropped below the national average, whereas Kymenlaakso's situation in earlier years had been clearly more dismal than in Finland on average.



Source: Statistics Finland

Evaluation: This indicator measures the number of those who have died before the age of 65 in relation to the overall population. Such deaths are clearly more frequent in Kymenlaakso than in Finland on average. The difference was at its greatest at the turn of the century, when the figure for Kymenlaakso was nearly 30% higher than the national average. After that, premature deaths have decreased and, in parallel, the difference to the national average has diminished notably.

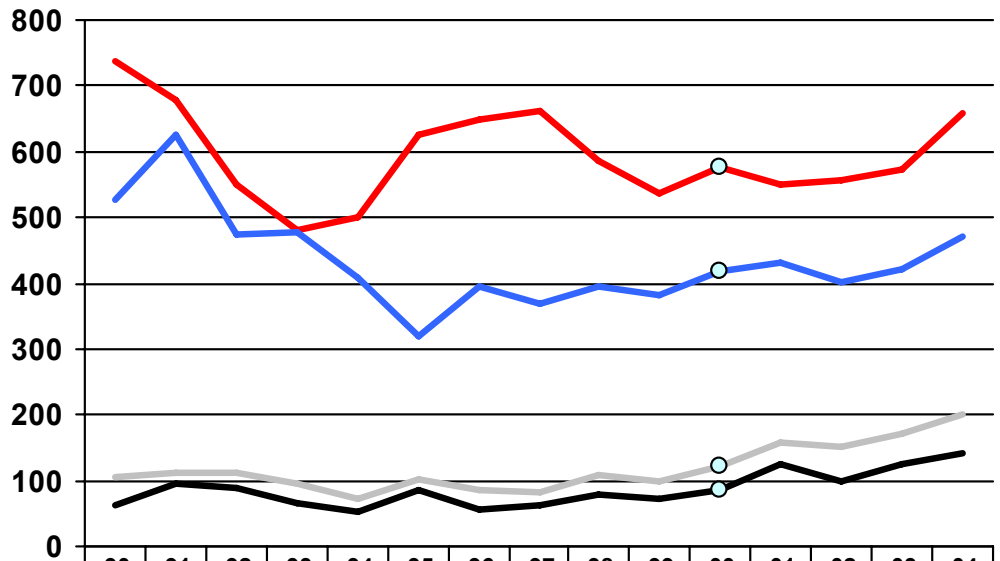
Connections: The number of people dying under the age of 65 is connected with, for instance, age structure, health, numbers of suicides and accidents, level of subsistence and the general pleasantness of the living environment. In relation to the number of households receiving social assistance, the number of premature deaths increased and remained high even after the number of social support recipients had turned the corner towards a decline. The delay between the respective peaks is some 3–4 years. We should, however, refrain from making too obvious cause-and-effect conclusions. It is also advisable to examine the causes of deaths. From the perspective of social policy, it is important to know which reason or reasons best explain the high incidence of premature deaths. This enables us to target countermeasures more accurately.



Source: Statistics Finland

Evaluation: The life expectancy of newborns in Kymenlaakso is shorter than the national average, but it has developed towards a more favourable direction during the 21st century. In 1999 and 2000, life expectancy in Kymenlaakso declined in contrast to the development in the country at large. In 2000, a child born in Kymenlaakso could expect a life more than 1.5 years shorter than an 'average' Finnish child. After 2000, the life expectancy for those born in Kymenlaakso has risen more than in the country on average. In 2004, the difference to the life expectancy in Finland as a whole had diminished to just over six months.

The life expectancy of men is clearly shorter than that of women, but on the other hand, the life expectancy of male newborns has risen clearly. In 2000, the life expectancy of girls was nearly nine years longer than for boys, but in 2004, this difference was reduced to just over seven years. In all of Finland, this difference in 2004 was just under seven years.

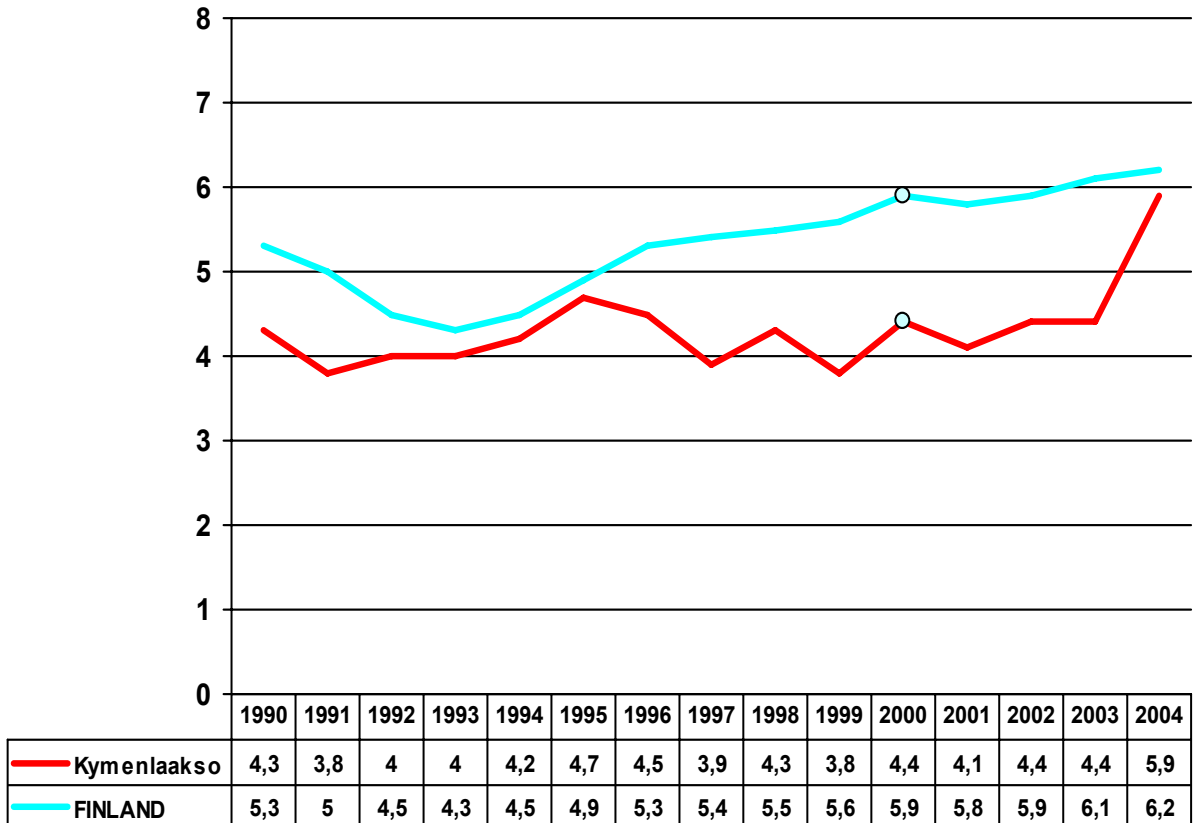


	-90	-91	-92	-93	-94	-95	-96	-97	-98	-99	-00	-01	-02	-03	-04
— Gross drunken driving	736	679	550	482	499	627	649	661	586	537	576	551	555	574	657
— Drunken driving	526	625	474	476	408	319	396	369	395	381	418	431	400	423	472
— Gross violation of traffic safety	104	111	111	97	71	101	86	82	107	99	123	159	150	170	201
— Gross violation of speed limits	62	95	89	65	53	86	55	62	80	72	86	125	100	124	140

Source: Statistics Finland (StatFin)

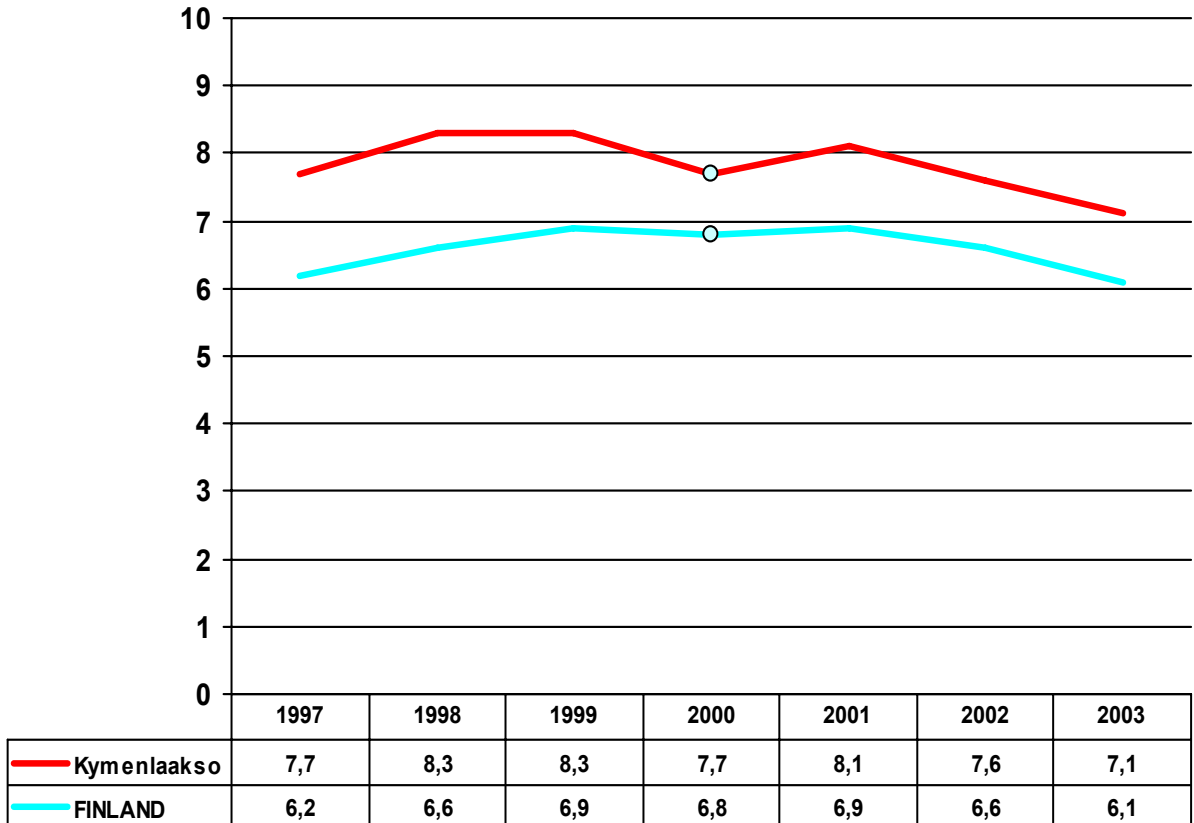
Evaluation: In studying crime and changes therein, one basic question is whether crime *per se* is changing as a phenomenon or whether the perceived change is a result of changes in crime control and discovery rates. Increase in control often also leads to an increase in crimes discovered. On the other hand, studies on traffic have shown that intensifying control influences traffic behaviour. We have no data on how traffic control has changed during the time series under investigation. However, we can estimate that control has at least not increased during the period in question. If this is the case, the increase in traffic violations uncovered would clearly indicate that the phenomenon itself has grown—i.e., traffic safety has deteriorated. The graph shows the following development during the 21st century: The number of violations in all categories of crime examined has gone up. The traffic safety of Kymenlaakso has deteriorated.

Connections to other phenomena: Among other issues, traffic safety is related to the atmosphere, aggressiveness and sense of fair play prevailing in society as well as to the number of road traffic accidents. During the last three years, road traffic accidents have not increased to the same extent as traffic violations. However, the violations are connected to the perceived level of traffic safety, though the actual incidents have not always led to accidents. In addition to violations, road traffic accidents are influenced by several other factors. We do know, however, that there is a clear connection at least between serious accidents and traffic violations (drunken driving, speeding).



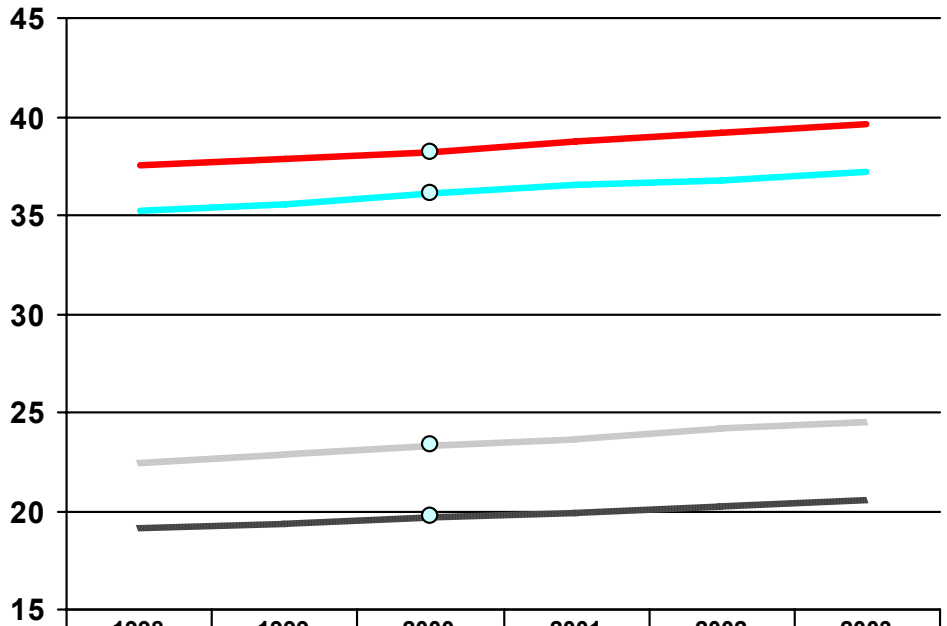
Source: Statistics Finland (StatFin)

Evaluation: In Kymenlaakso, the number of violent crimes reported or otherwise discovered by the police has been fewer than the national average. At times, the difference has been quite clear, while at other times it has been reduced: the latest leap towards the national average in Kymenlaakso occurred in 2004. Violent crime is not one of the region's special problems, though crime levels have gone up just as they have in the country at large and, therefore, safety has deteriorated. The figures have nearly doubled since the early 1980s.



Source: Statistics Finland, traffic and travel statistics

Evaluation: More road traffic accidents occur in Kymenlaakso than in Finland on average. The difference is quite significant. However, the principal direction of development in recent years has pointed towards a decline.

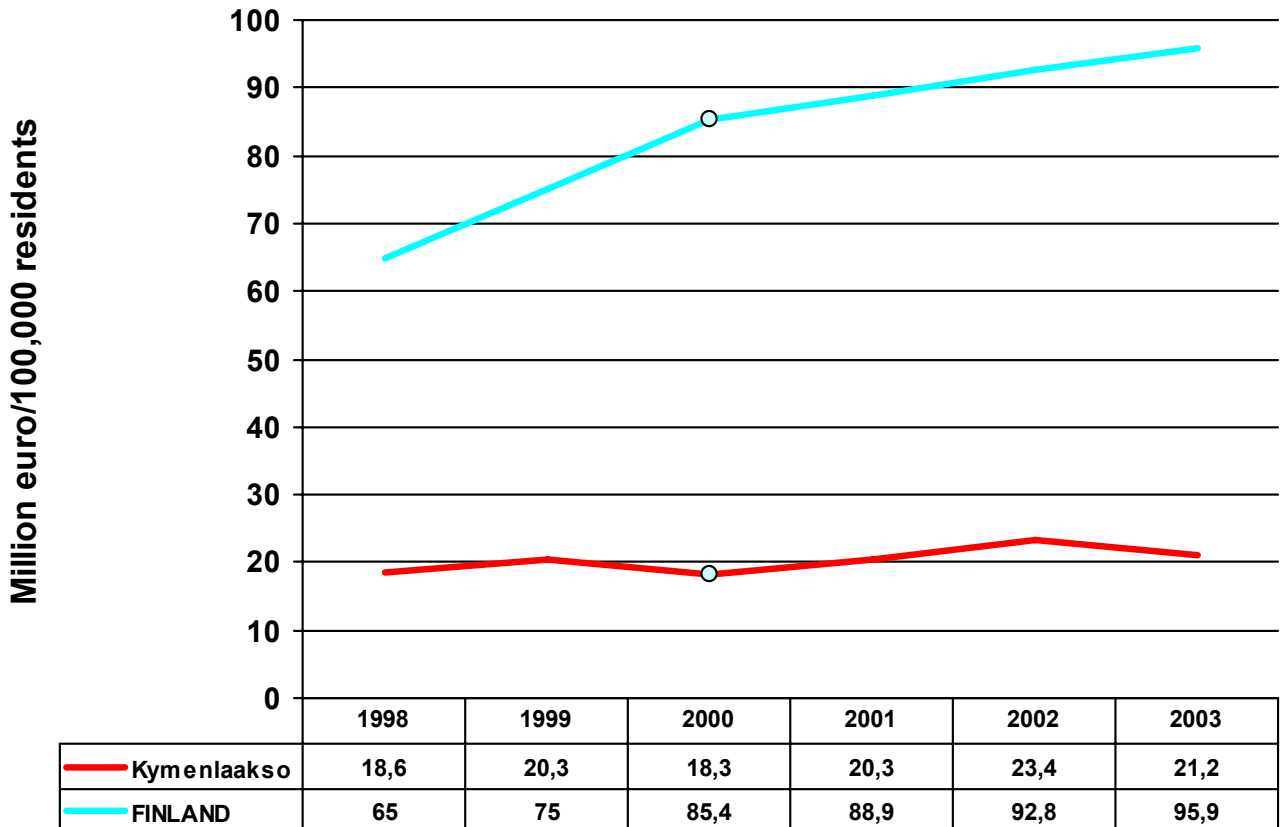


	1998	1999	2000	2001	2002	2003
Secondary, Kymenlaakso	37,5	37,9	38,2	38,7	39,2	39,6
Secondary, FINLAND	35,2	35,6	36,1	36,5	36,8	37,2
Higher, Kymenlaakso	19,2	19,4	19,7	19,9	20,3	20,6
Higher, FINLAND	22,5	22,9	23,3	23,7	24,2	24,6

Source: Statistics Finland, StatFin/education and population databases

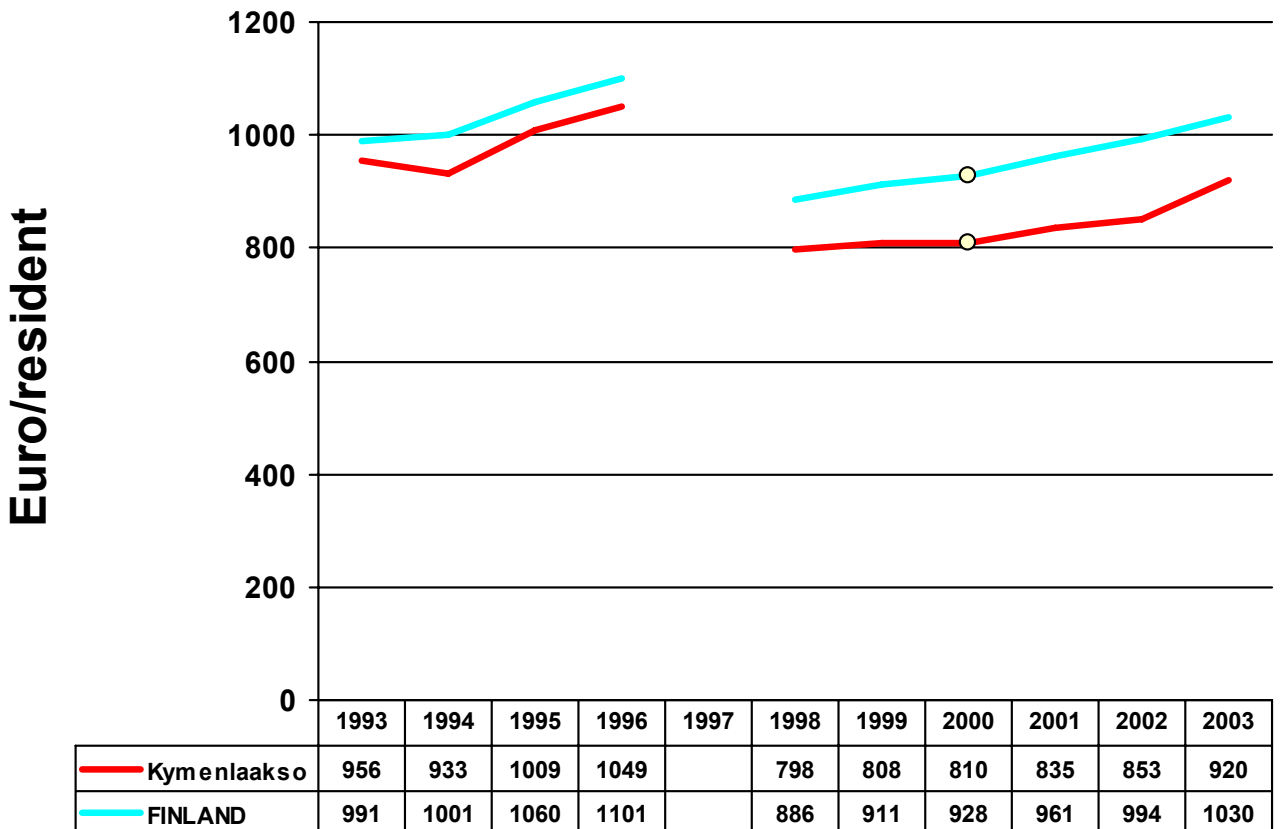
Evaluation: The proportion of those who have completed a diploma or degree out of the overall adult population has grown quite evenly in both Kymenlaakso and Finland on average. However, there are some differences. Kymenlaakso has fewer residents with higher education and, on the other hand, more residents who have completed secondary education. The development trends are also different. In Kymenlaakso, the increase in the number of higher education degrees has been slower than the national average. The change in the proportion of higher education graduates from 1998 to 2003 was +2.1 percentage points for all of Finland and +1.1 percentage points for Kymenlaakso. The conclusion is that Kymenlaakso has not been able to attract or hold onto as large a number of higher education graduates as some other regions in the country. The number of secondary education graduates has increased steadily in both Kymenlaakso and Finland at large.

The essential connections to other regional phenomena: A list of phenomena connected to the educational level of the region's population includes, among other issues, migration, job offering, development of employment and educational opportunities.



Source: Statistics Finland

Evaluation: The expenditures on research and development in Kymenlaakso are clearly lower than the national average. In 2003, the national average of funds spent on R&D activities per resident was four times higher than the sum spent per resident in Kymenlaakso. Typically, R&D expenditures are concentrated on specific areas, for example, the Helsinki region and university centres. In 2003, the expenditures in Kymenlaakso amounted to 0.79% of the overall Finnish R&D expenditures; in 1995, this proportion was 1.05%, and the lowest point was reached in 2000 with a proportion of 0.78%. The sum calculated per resident has remained quite level in Kymenlaakso, whereas research and development expenditures in the country at large have experienced linear growth.

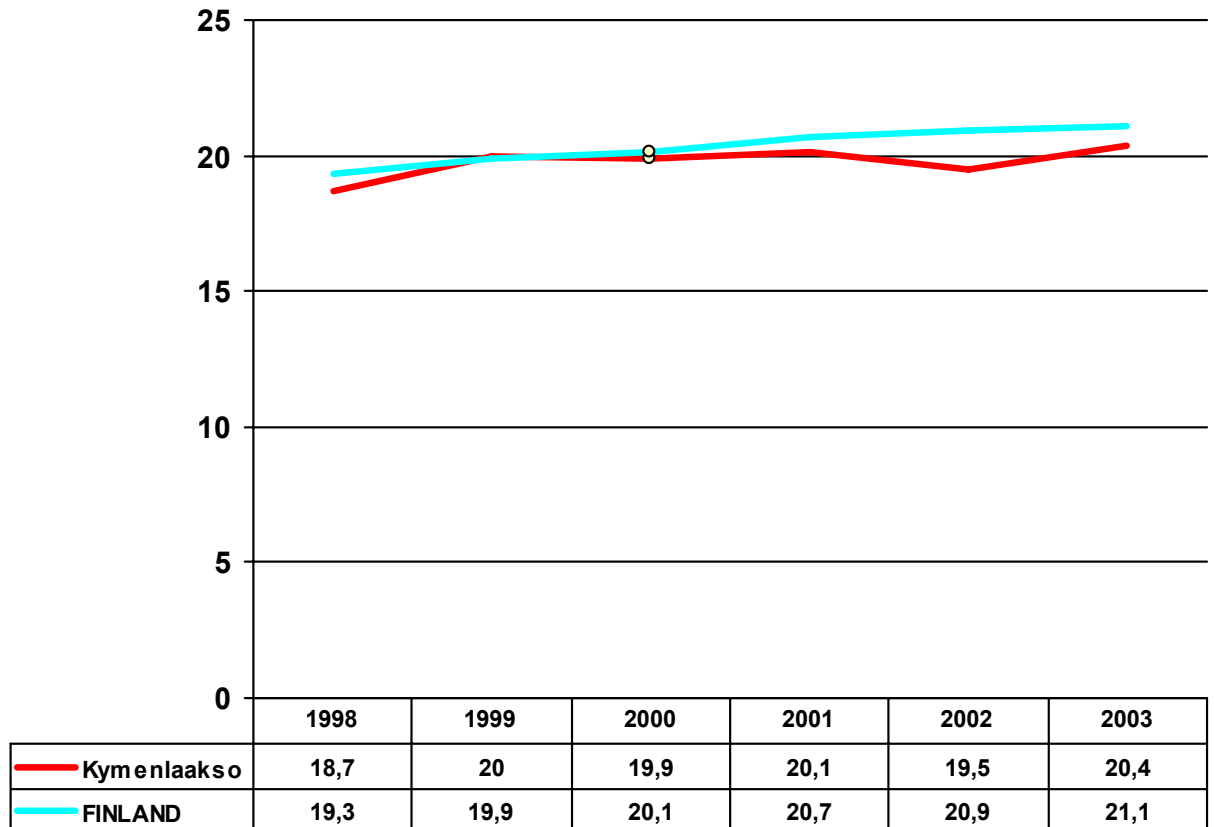


Source: Statistics Finland

Evaluation: With the net public expenditures on education and culture indicator, we seek to estimate the resources allocated to education and culture and, therefore, the role and emphasis assigned to them in municipal activities. This indicator is not completely unproblematic. The differences in figures for various regions may be caused by some attempting to produce the same services with lower costs and, on the other hand, by actual differences in value judgements and contents. Therefore, this indicator does not directly measure the actual impact of the phenomenon measured, but rather can provide related clues. In Kymenlaakso, the net sum used is roughly 90% of the national average and, starting from 1998, the development trend in Kymenlaakso has clearly fallen behind the country at large—though the difference was reduced slightly in 2003. In 1997, the state subsidy system was revised, which explains the break in the time series.



Loans from libraries/resident



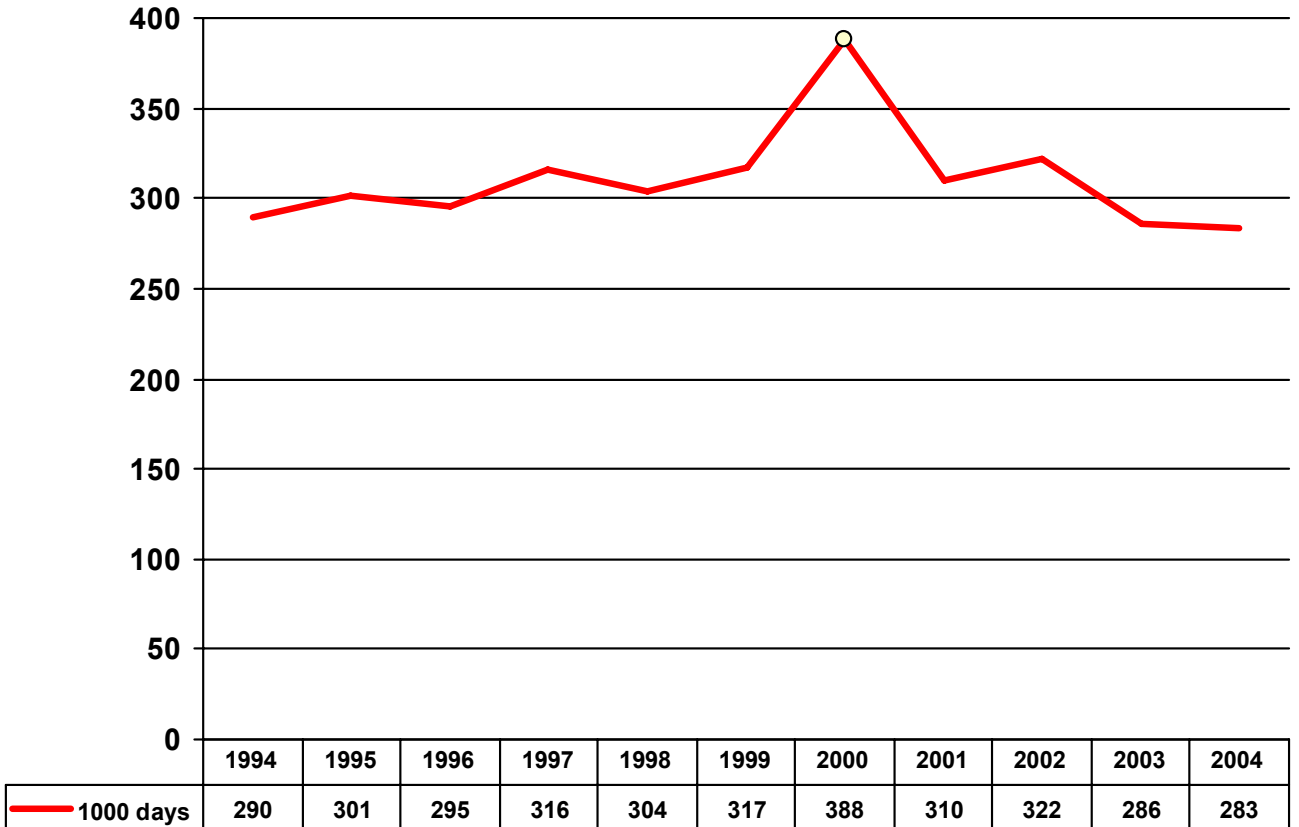
Source: <http://tilastot.kirjastot.fi>

Evaluation: The number of loans from public libraries in all of Finland has grown quite steadily. The development in 21st-century Kymenlaakso has been more modest, and the region has fallen behind the national average. However, the number of loans went up in 2004 and the difference to the national average was diminished. On the whole, Kymenlaakso does not deviate from the general level in the country to any significant degree with regard to this indicator, despite falling slightly behind.



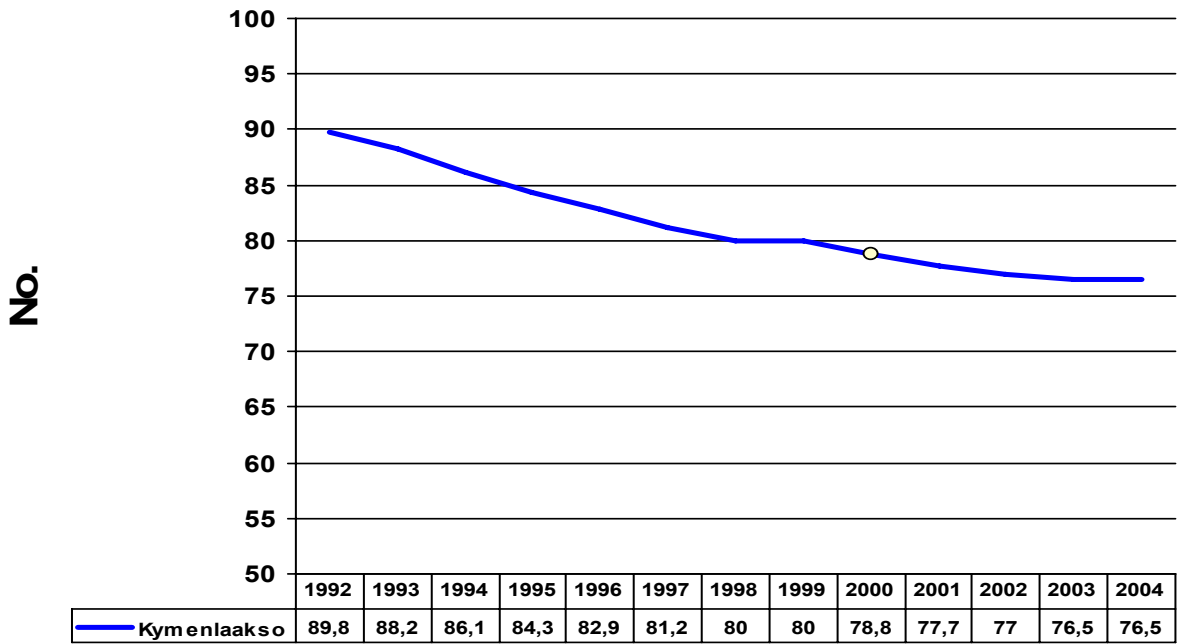
Source: Statistics Finland

Evaluation: The voting rate in the municipal elections of Kymenlaakso and the national average do not show a difference. The rate has dropped quite clearly in twenty years, though the activity picked up some during the latest elections (2004). It is difficult to evaluate to what degree the decline in voting rates is due to a dilution of local identity and how much of it is caused by a general decrease in political interest. In any case, the decline in voting activity obscures the connection between decision-makers and residents.

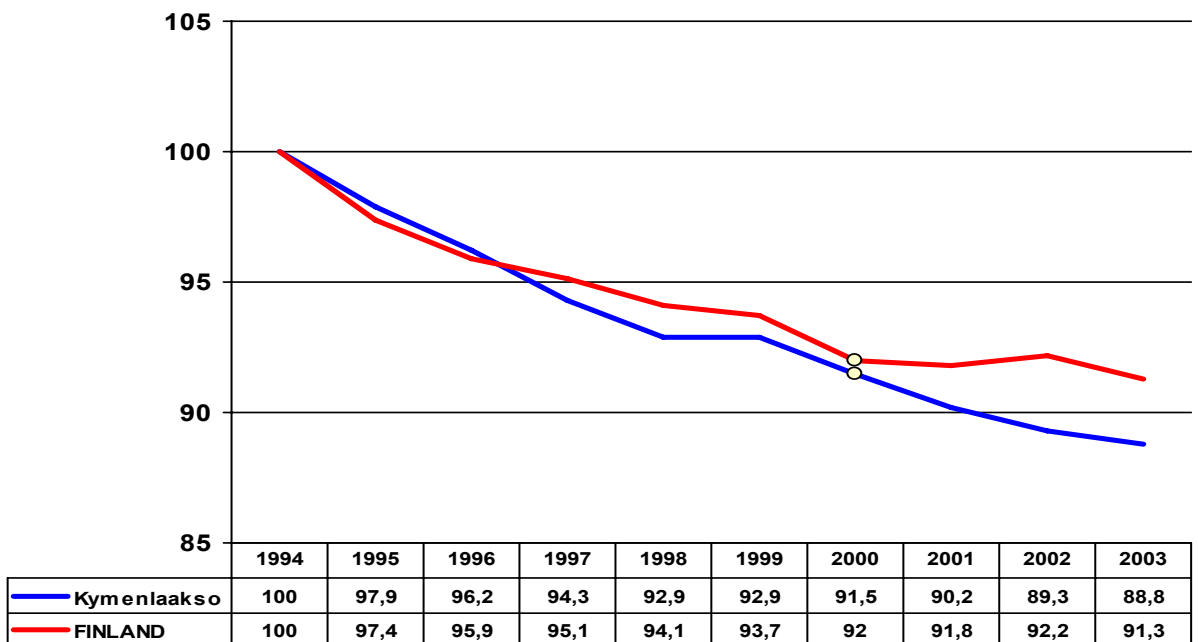


Source: Statistics Finland

Evaluation: The number of nights spent in hotels in the Kymenlaakso region has not increased. During the last two years, the trend has been on a slight decline. The use of hotel services is evaluated to reflect the attractiveness of a region in the eyes of visitors as well as those travelling within their home region. Measured with this indicator, the attractiveness of Kymenlaakso has not improved.



Source: Statistics Finland



Source: Finnish Audit Bureau of Circulations, Statistics Finland

Evaluation: The circulation of newspapers has declined, but not to a significant degree. When we compare the combined circulation of newspapers appearing in Kymenlaakso to the overall Finnish circulation of newspapers, the decline from 1994 to 2000 was only slightly more intense in Kymenlaakso. However, from 2000 onwards, the decline in newspaper circulations in Kymenlaakso has been more intense than the national average. Therefore, we can conclude that local identity measured in the circulation of newspapers has been obscured to some degree in Kymenlaakso.

SPECIALIST EVALUATIONS FOR THE DEVELOPMENT TRENDS OF KYMENLAAKSO'S ENVIRONMENTAL INDICATORS IN 2004



INDICATOR DEVELOPING IN A POSITIVE DIRECTION SINCE 2000



NO OBSERVABLE CHANGES IN INDICATOR DEVELOPMENT



INDICATOR DEVELOPING IN A NEGATIVE DIRECTION SINCE 2000

EMISSIONS INTO THE AIR

Y1	CO ₂ emissions from industry, energy production and road traffic	
Y2	NO _x emissions from industry, energy production and road traffic	
Y3	SO ₂ emissions from industry and energy production	
Y4-6	Metal emissions (Cd, Pb, Hg)	
Y7	Emissions of dioxins and furans	
Y8	Emissions of polyaromatic hydrocarbons (PAH emissions)	

LOCAL AIR QUALITY

Y9	No. of days when the limit value for the average concentration (50 µg/m ³) of PM10 is exceeded	
Y10	No. of days when the average concentration of TRS compounds exceeds 4 µg/m ³	

WATER

Y11	Nitrogen loads to waters from communities, rural settlements and industry	
Y12	Groundwater chloride concentrations	
Y13	Groundwater nitrate nitrogen concentrations	
Y14	Riparian zone contracts concerning special measures of agri-environmental support	

TRAFFIC

Y15	Traffic mileages	
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OIL AND CHEMICAL ACCIDENTS

Y16	Oil and chemical accidents (no., 1,000 l)	
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BIODIVERSITY

Y17	Traditional biotope, landscape management and biodiversity enhancement contracts concerning special measures of agri-environmental support	
Y18	Contracts concerning environmental support for forestry	
Y19	Total area of conservation areas	
Y20	Total area of regeneration fellings	

USE OF NATURAL RESOURCES

Y21	Development of the growing stock of forests (increment/fellings)	
Y22	Quantity of gravel and rock extracted	
Y23	Landfilling of municipal waste from households	
Y24	Recovery rate of municipal waste from households	

ENERGY CONSUMPTION

Y25	Consumption of electricity	
Y26	Consumption of district heat	
Y27	Self-sufficiency in energy production	

**SPECIALIST EVALUATIONS FOR THE DEVELOPMENT TRENDS
OF KYMENLAAKSO'S ECONOMIC AND SOCIO-CULTURAL INDICATORS IN 2004**



INDICATOR DEVELOPING IN A POSITIVE DIRECTION SINCE 2000



NO OBSERVABLE CHANGES IN INDICATOR DEVELOPMENT



INDICATOR DEVELOPING IN A NEGATIVE DIRECTION SINCE 2000

ECONOMY

T1	Volume growth of value added	
T2	Value added per resident	
T3	Value added per area	
T4	GDP in 2003 per resident	
T5	GDP in 2003 per area	
T6	Real disposable income per resident	

POPULATION CHANGE

S1	Net migration	
S2	Excess of births	
S3	Dependency ratio	
S4	Number of foreign citizens	

EMPLOYMENT

S5	Unemployment rate	
S6	Job structure	

SOCIAL EXCLUSION

S7	Number of households receiving social assistance	
S8	Number of suicides	

HEALTH

S9	Number of deaths before the age of 65	
S10	Life expectancy of newborns	

SAFETY

S11	Traffic violations	
S12	Violent crimes	
S13	Road traffic accidents	

EDUCATION

S14	Number of secondary and higher education graduates	
S15	R & S expenditures	

CULTURE

K1	Net public education on education and culture	
K2	Number of loans from public libraries	

LOCAL IDENTITY

K3	Voting rate in municipal elections	
K4	Nights spent in hotels	
K5	Circulation of newspapers	

**THE ABSOLUTE DEVELOPMENT OF KYMENLAAKSO'S
ENVIRONMENTAL INDICATORS
AND THEIR RELATIONSHIP TO NATIONAL AVERAGES IN 2004**

NO.	INDICATOR	ABSOLUTE DEVELOPMENT	DEVELOPMENT COMPARED TO NATIONAL DEVELOPMENT*
Y1	CO ₂ emissions from industry, energy production and road traffic		
Y2	NO _x emissions from industry, energy production and road traffic		
Y3	SO ₂ emissions from industry and energy production		
Y4	Mercury emissions into the air (Hg)		
Y5	Cadmium emissions into the air (Cd)		
Y6	Lead emissions into the air (Pb)		
Y7	Emissions of dioxins and furans		
Y8	PAH emissions		
Y9	Average no. of days when PM10 limit value (50 µg/m ³) is exceeded		
Y10	No. of days when average concentrations of TRS exceed 4 µg/m ³		
Y11	Nitrogen loads to waters from communities, rural settlements and industry		
Y12	Groundwater chloride concentrations		
Y13	Groundwater nitrate nitrogen concentrations		
Y14	Riparian zone contracts concerning special measures of agri-env. support		
Y15	Traffic mileages		
Y16	Oil and chemical accidents		
Y17	Contracts concerning special measures of agri-environmental support		
Y18	Contracts concerning environmental support for forestry		
Y19	Total area of conservation areas		
Y20	Total area of regeneration fellings		
Y21	Development of the growing stock of forests		
Y22	Quantity of gravel and rock extracted		
Y23	Landfilling of municipal waste from households		
Y24	Recovery rate of municipal waste from households		
Y25	Consumption of electricity		
Y26	Consumption of district heat		
Y27	Self-sufficiency in energy production		

* Reliable data not available

COMPARISON	COLOUR CODE	SPECIFICATION OF COLOUR CODE
ABSOLUTE DEVELOPMENT		ABSOLUTE DEVELOPMENT IN 2000–2004 POSITIVE
		ABSOLUTE DEVELOPMENT IN 2000–2004 NEUTRAL
		ABSOLUTE DEVELOPMENT IN 2000–2004 NEGATIVE
DEVELOPMENT COMPARED TO NATIONAL DEVELOPMENT		DEVELOPMENT IN 2000–2004 COMPARED TO NATIONAL DEVELOPMENT POSITIVE
		DEVELOPMENT IN 2000–2004 COMPARED TO NATIONAL DEVELOPMENT NEUTRAL
		DEVELOPMENT IN 2000–2004 COMPARED TO NATIONAL DEVELOPMENT NEGATIVE
STATUS COMPARED TO NATIONAL STATUS		STATUS IN 2000–2004 COMPARED TO NATIONAL STATUS GOOD
		STATUS IN 2000–2004 COMPARED TO NATIONAL STATUS NEUTRAL
		STATUS IN 2000–2004 COMPARED TO NATIONAL STATUS POOR

THE DEVELOPMENT OF KYMENLAAKSO'S ECONOMIC INDICATORS AND THEIR RELATIONSHIP TO NATIONAL AVERAGES IN 2004

NO.	INDICATOR	ABSOLUTE DEVELOPMENT	DEVELOPMENT COMPARED TO NATIONAL DEVELOPMENT	STATUS COMPARED TO NATIONAL STATUS
T1	Volume growth of value added			
T2	Value added per resident			
T3	Value added per area			
T4	GDP in 2003 per resident			
T5	GDP in 2003 per area			
T6	Real disposable income per resident			

COMPARISON	COLOUR CODE	SPECIFICATION OF COLOUR CODE
ABSOLUTE DEVELOPMENT		ABSOLUTE DEVELOPMENT IN 2000–2004 POSITIVE
		ABSOLUTE DEVELOPMENT IN 2000–2004 NEUTRAL
		ABSOLUTE DEVELOPMENT IN 2000–2004 NEGATIVE
DEVELOPMENT COMPARED TO NATIONAL DEVELOPMENT		DEVELOPMENT IN 2000–2004 COMPARED TO NATIONAL DEVELOPMENT POSITIVE
		DEVELOPMENT IN 2000–2004 COMPARED TO NATIONAL DEVELOPMENT NEUTRAL
		DEVELOPMENT IN 2000–2004 COMPARED TO NATIONAL DEVELOPMENT NEGATIVE
STATUS COMPARED TO NATIONAL STATUS		STATUS IN 2000–2004 COMPARED TO NATIONAL STATUS GOOD
		STATUS IN 2000–2004 COMPARED TO NATIONAL STATUS NEUTRAL
		STATUS IN 2000–2004 COMPARED TO NATIONAL STATUS POOR

THE DEVELOPMENT OF KYMENLAAKSO'S SOCIO-CULTURAL INDICATORS AND THEIR RELATIONSHIP TO NATIONAL AVERAGES IN 2004

NO.	INDICATOR	ABSOLUTE DEVELOPMENT	DEVELOPMENT COMPARED TO NATIONAL DEVELOPMENT	STATUS COMPARED TO NATIONAL STATUS
S1	Net migration	Green	Yellow	Red
S2	Excess of births	Red	Red	Red
S3	Dependency ratio	Green	Green	Red
S4	Number of foreign citizens	Green	Green	Yellow
S5	Unemployment rate	Green	Green	Red
S6	Job structure	Yellow	Yellow	Yellow
S7	Number of households receiving social assistance	Green	Green	Green
S8	Suicides	Green	Green	Green
S9	Number of deaths before the age of 65	Green	Green	Red
S10	Life expectancy of newborns	Green	Green	Red
S11	Traffic violations	Red	Yellow	Yellow
S12	Violent crimes	Red	Red	Green
S13	Road traffic accident	Green	Red	Red
S14	Number of secondary and higher educ. graduates	Green	Yellow	Yellow
S15	R & D expenditures	Green	Red	Red
K1	Net public expenditures on education and culture	Green	Green	Red
K2	Number of loans from public libraries	Green	Red	Red
K3	Voting rate in municipal elections	Green	Yellow	Red
K4	Nights spent in hotels	Red	Red	Yellow
K5	Circulation of newspapers	Red	Red	Red

COMPARISON	COLOUR CODE	SPECIFICATION OF COLOUR CODE
ABSOLUTE DEVELOPMENT	Green	ABSOLUTE DEVELOPMENT IN 2000–2004 POSITIVE
	Yellow	ABSOLUTE DEVELOPMENT IN 2000–2004 NEUTRAL
	Red	ABSOLUTE DEVELOPMENT IN 2000–2004 NEGATIVE
DEVELOPMENT COMPARED TO NATIONAL DEVELOPMENT	Green	DEVELOPMENT IN 2000–2004 COMPARED TO NATIONAL DEVELOPMENT POSITIVE
	Yellow	DEVELOPMENT IN 2000–2004 COMPARED TO NATIONAL DEVELOPMENT NEUTRAL
	Red	DEVELOPMENT IN 2000–2004 COMPARED TO NATIONAL DEVELOPMENT NEGATIVE
STATUS COMPARED TO NATIONAL STATUS	Green	STATUS IN 2000–2004 COMPARED TO NATIONAL STATUS GOOD
	Yellow	STATUS IN 2000–2004 COMPARED TO NATIONAL STATUS NEUTRAL
	Red	STATUS IN 2000–2004 COMPARED TO NATIONAL STATUS POOR

Eco-efficiency indicators for the Kymenlaakso Region

During 2005, the Southeast Finland Regional Environment Centre, Regional Council for Kymenlaakso, Employment and Economic Development Centre for Southeast Finland and Regional Road Administration of Southeast Finland conducted the first annual update of the eco-efficiency indicators selected for annual monitoring in the ECOREG project.

This report demonstrates the developments which have occurred during 2000–2004 with regard to the environmental, economic and socio-cultural indicators of Kymenlaakso. In addition to this, the report includes an overview of the annual monitoring procedures and schedules as well as the development goals brought up during the updating process.

Produced with the contribution of the European Community, the Regional Council of Kymenlaakso and the Finnish Environment Institute.



SOUTHEAST FINLAND
REGIONAL
ENVIRONMENT CENTRE



REGIONAL COUNCIL OF KYMENLAAKSO