

02

Territory and Environment

694-1000

Swiss Environmental Statistics A Brief Guide 2010



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Neuchâtel, 2010

REMARKS

Index

Trends in totally different variables can be directly compared using indices, on condition that the same year is chosen as a basis (e.g. 1990=100).

Rounded figures

Figures are rounded up or down, which may mean that their sum differs from the total given.

Glossary

Terms in *italics* are explained in the glossary (page 37).

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SWISS ENVIRONMENTAL STATISTICS

A BRIEF GUIDE 2010

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1 Population and households

At the end of 2009, just under 7.8 million people lived in Switzerland. This is 1% more than in the previous year and 23% more than in 1980.

Between 1980 and 2008, the percentage of single person households increased from 29% to 37% of all private households.

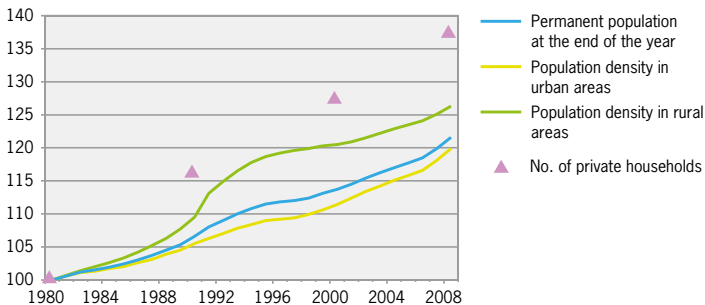
Between 1980 and 2000, the average area of living space per person increased by 29% or by half a square meter every year.

Today approximately three-quarters of the population of Switzerland live in urban areas. While more and more people work in towns and cities, they are tending to live farther away from their workplace. The consequence of this trend is increased building in rural areas and more commuting.

This changing pattern also affects the environment: the desire for more living space has led to the number of households increasing more than the population. The number of people per private household has fallen: while the average number of people per household was 2.5 in 1980, this figure had dropped to 2.2 by 2008.

Population, population density and households

Index 1980=100



Source: Federal Statistical Office

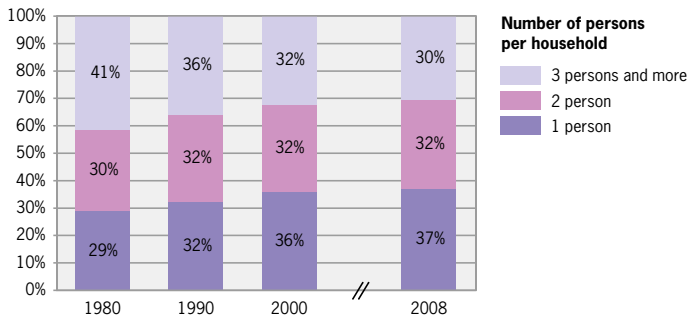
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More about this topic:

www.statistics.admin.ch → Topics → Population
www.socio.ethz.ch/research/umweltsurvey

Household size (private households)

Percentage of all private households



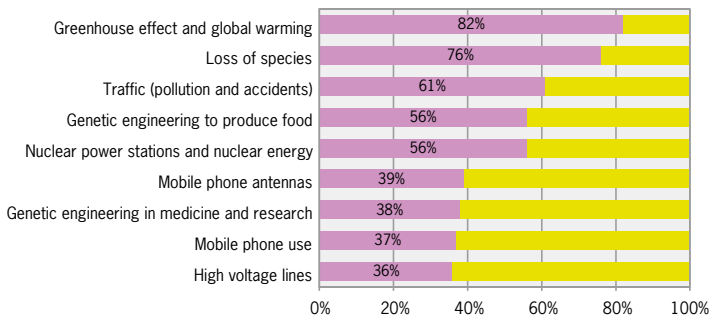
Source: Federal Statistical Office

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Opinion poll on dangers for people and environment

How high do you rate the danger for humans and the environment
(1 "no danger" to 5 "very high danger")?

Percentage of persons interviewed in 2007 who rated the danger as "high" (4) to "very high" (5)



Source: "Umweltsurvey 2007" (ETH Zurich)

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2 Agriculture

In 2008, 11% of utilised agricultural area was used for organic production. After major growth at the end of the 1990s, the proportion of organic farmland has stagnated since 2004.

Since 1990 agriculture's nitrogen surplus has decreased by 18% and stagnated since 2000.

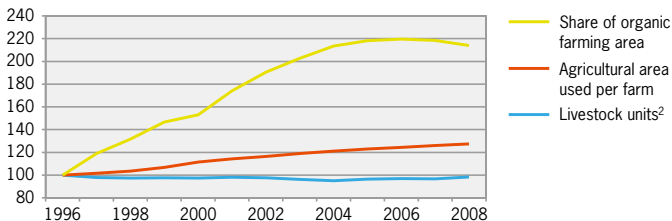
Over the past 24 years, arable land has decreased by 7% in western Switzerland¹. A quarter of the arable land that has disappeared has been covered with paving, concrete or tarmac.

The proof of ecological performance (ÖLN) constitutes the basis for the implementation of environmental criteria in agriculture, and is a prerequisite for federal payments. The conditions include the well-balanced use of fertilisers, a minimum of 7% ecological set-aside areas, crop rotation, appropriate protection of soils and livestock and the restrained and specific use of crop protection agents. Since 2001, the Ordinance on Ecological Quality (ÖQV) offers additional financial support for ecological compensation areas of particular biological quality and for the interconnection of such areas. These measures are intended to favour natural biodiversity, reduce the pollution of rivers and lakes and promote animal-friendly conditions for livestock.

¹ Basis for data: 52% of surface area. Investigations are underway for the rest of Switzerland.

Changes in agriculture

Index 1996=100



² With livestock units (LU) different productive livestock can be compared to one another. 1 LU equals feed consumption, manure and slurry of a cow weighing 650 kg.

Source: Federal Statistical Office

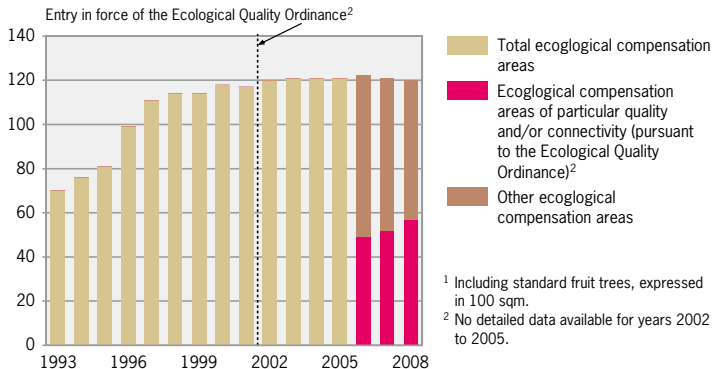
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More about this topic:

www.statistics.admin.ch → Topics → Agriculture, forestry
www.landuse-stat.admin.ch
www.foag.admin.ch

Ecological compensation areas

Areas qualifying for subsidies¹, in 1000 hectares

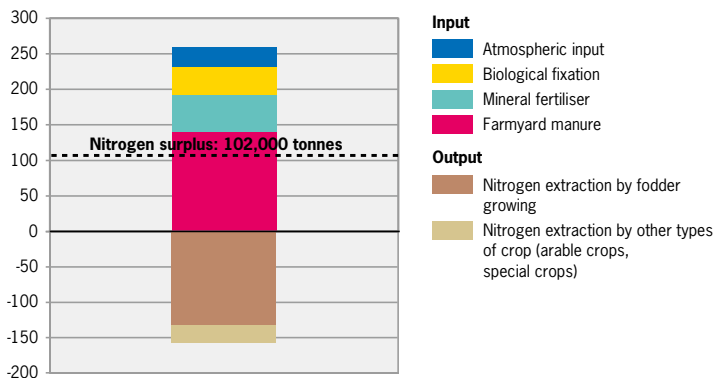


Source: Federal Office for Agriculture

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Nitrogen balance of agricultural areas, 2008

Amounts of nitrogen entering agricultural soils or extracted from them, in thousand tonnes



Sources: Federal Statistical Office; OECD

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3 Consumption

Between 1990 and 2008, average consumer spending per person increased by 12% (inflation-adjusted).

In 2008, households accounted for 28% of *final energy* consumption (excluding transport).

In 2008, the total daily consumption of drinking water per person was 214 litres.

Our life-style and consumption habits are closely linked to our consumption of energy, drinking water and materials as well as with the amount of waste produced. Individual behaviour has only a minor influence on the environment while the strain on the environment caused by the population as a whole is considerable.

Household expenditure on consumer goods, consumption of drinking water and energy

Index 1990=100



Sources: Federal Statistical Office; Federal Office of Energy;
Swiss Association of Gas and Water Suppliers

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More about this topic:

www.monet.admin.ch
www.environment-switzerland.ch/products

4 Energy

Since 1990, *final energy* consumption has risen by just under 13%.

In 2008, 18.5% of final energy consumption was derived from *renewable* sources (including wood and hydro-power).

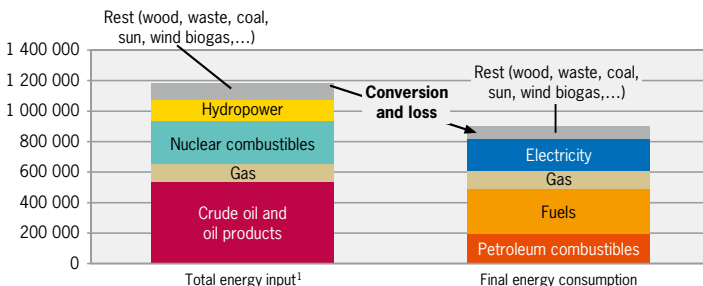
In 2008, 80% of Switzerland's energy demand was met by imported energy.

Short term energy consumption is dictated by the economic situation and weather conditions. In the longer term, however, population and economic growth as well as technological and life-style changes are also determining factors.

Representing around a third of *final energy* consumption, transport (including private transport) is proportionally the largest consumer group. Households account for a quarter (in particular heating energy), industry and services for the rest. Four-fifths of Switzerland's energy needs are supplied from abroad, particularly by importing oil, natural gas and nuclear combustibles. Fossil fuels such as oil, natural gas and coal account for around two-thirds of the energy consumed in Switzerland. Both the provision (exploitation and production) and the consumption of energy have an effect on the environment. Problems arise in connection with, among other things, the air pollutants and *greenhouse* gases that are released during burning processes.

Total energy input and *final energy* consumption, 2008

By energy source, in terajoules



Source: Federal Office of Energy

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More about this topic:

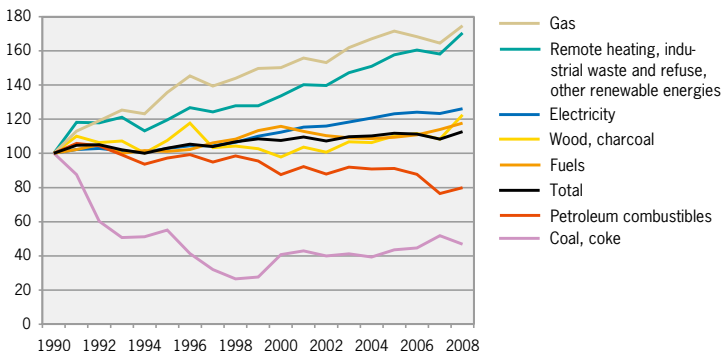
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Final energy consumption by energy carrier

Index 1990=100

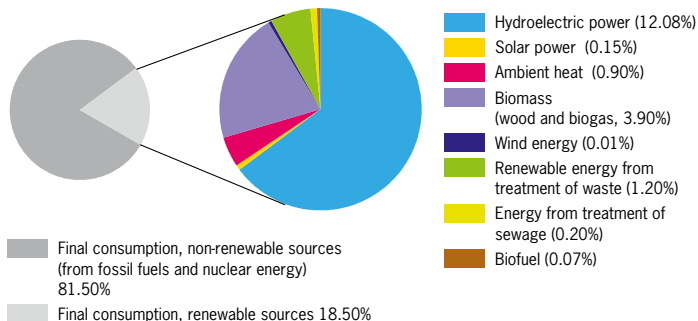


Source: Federal Office of Energy

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Share of renewable energy in final energy consumption, 2008

By technologies



Source: Federal Office of Energy

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5 Transport and mobility

Between 1990 and 2008, rail freight transport increased by 32% while road freight transport increased by 50%.

In 2008, transport was responsible for 34% of total *final energy* consumption.

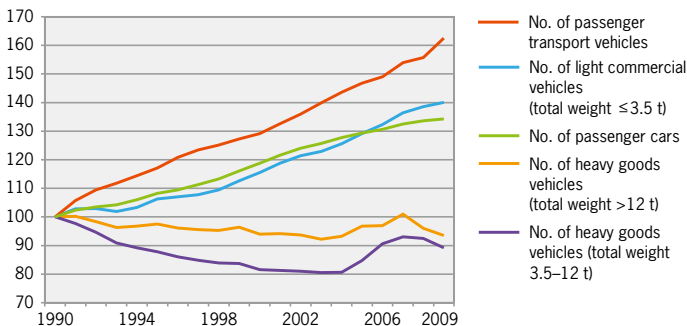
In 2009, some 4 million passenger cars were registered in Switzerland.

There are many aspects to the downside of increased mobility: noise pollution, land-surface use and landscape fragmentation, the effects of the expansion of transport infrastructure, the *emission of greenhouse gases* and increasing air pollution: these are all a burden on the environment.

Although the implementation of regulations on air quality and technological improvements have led to a marked reduction in the emission of air pollutants from transport, due to the massive increase in transport these successes can only be seen as relative.

Pool of road motor vehicles

Index 1990=100



Source: Federal Statistical Office

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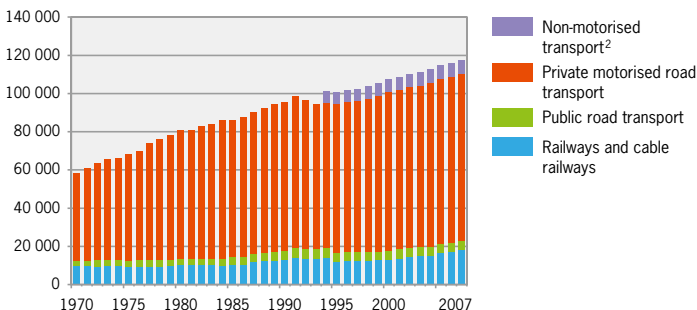
www.statistics.admin.ch → Topics → Mobility and transport

www.environment-switzerland.ch → Topics → Transports

www.are.admin.ch

Passenger transport performance

Million person-kilometres¹



¹ One kilometre travelled by one person

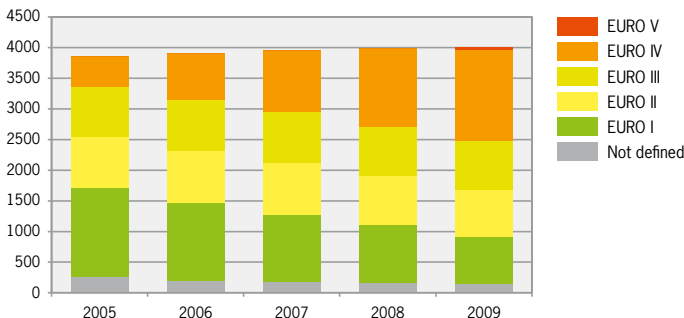
² Non-motorised transport registered since 1994

Source: Federal Statistical Office

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Passenger cars by emission categories

Number of vehicles that meet the relevant Euronorm³, in thousands



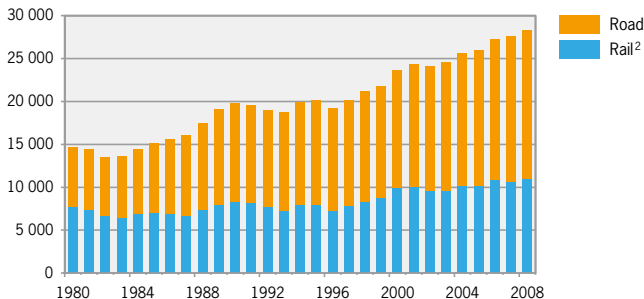
³ The Euronorms define limits for pollutant emissions (carbon monoxide, hydrocarbons, nitrogen oxides and particulate matter) for new cars. The higher the norm, the stricter are the requirements.

Source: Federal Roads Office

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Freight transport performance

Million tonne-kilometres¹



¹ Transport of one ton for one kilometre

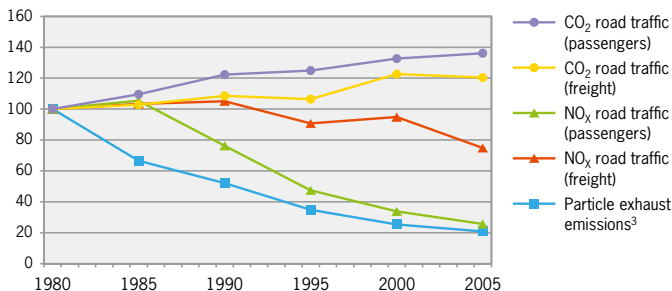
² Net tonne-kilometres: not including weight of freight transport vehicles (and trailers), containers and mobile bodies in combined transport.

Source: Federal Statistical Office

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CO₂, nitrogen oxide (NO_x) and particle exhaust emissions caused by road traffic

Index 1980=100



³ Particle exhaust is only a part of fine dust emissions (PM₁₀). Fine dust also includes those particles which enter the atmosphere through abrasion and resuspension.

Source: Federal Office for the Environment

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6 Noise

In Switzerland, around 1.3 million people are affected by excessive traffic noise.

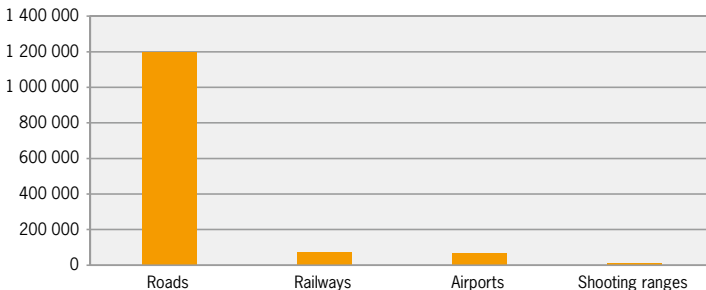
Persistent noise and agitation are damaging to health and cause external costs of about CHF 1 billion every year.

The loss in value of a property is about 1% per additional decibel.

People are constantly subjected to noise in their surroundings, their job and their leisure time. Noise pollution consists of undesirable sounds whose effects of disturbance are highly subjective. The main source of noise pollution is traffic. Both the psychological effects (discomfort, stress, communication and sleeping problems) and the physical effects (damage to hearing, high blood pressure) of noise on health are often underestimated. At the same time, noise pollution can also have economic consequences such as the difficulty to let certain properties and rising spatial development costs, or indeed social consequences. In view of society's growing mobility, some of the successes achieved in noise reduction have been undermined.

Persons affected by noise

Number of persons exposed to noise *immissions* over the limit value during the day, 2009



Source: Federal Office for the Environment

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More about this topic:

www.environment-switzerland.ch/noise

7 Non-ionising radiation

Since 2007, the number of registered mobile phone subscribers outnumbers the population. At the end of 2009 there were 119 mobile phone contracts for ever 100 persons.

In 2009, mobile telephony antennas were situated at almost 14,000 locations.

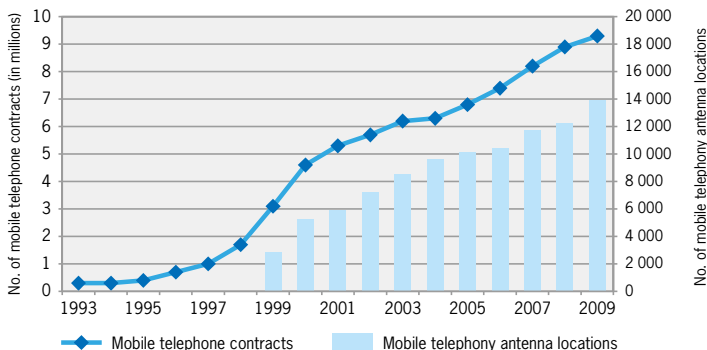
The threshold levels for *immissions* are generally respected.

Technologically produced non-ionising radiation (NIR) – commonly known as *electrosmog* – is the product of installations that supply electricity, electrical appliances and emitters for various telecommunication uses. Nowadays it is omnipresent.

Owing to the increasing demand for electricity, the growing number of electrical appliances and the rapid boom in mobile telephony, pollution in the form of non-ionising radiation is likely to increase in the future.

The effects of this type of radiation on humans and on the environment are not yet fully understood. It is suspected that long-term exposure to small doses could affect health or personal well-being but there is no definite proof. A principle of caution can be adopted by promoting low-radiation technologies and reducing radiation exposure.

Mobile telephone contracts and mobile telephony antennas



Source: Federal Office of Communications

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More about this topic:

www.environment-switzerland.ch → Topics → Electrosmog

8 Chemicals

Worldwide some 100,000 chemical substances are used for commercial purposes.

In 2009, 32 new substances were registered in Switzerland.

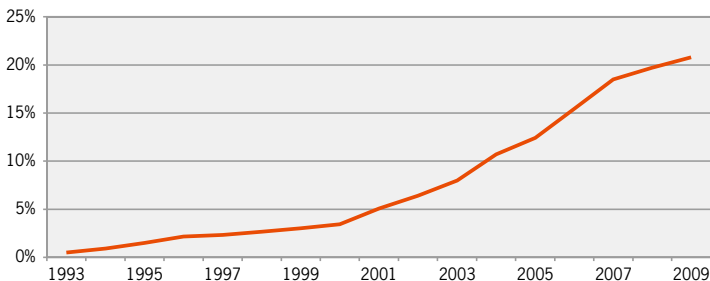
With a share of about 4% of worldwide exports of chemical and pharmaceutical products, Switzerland was the ninth largest exporting country in the world in 2009 in this product range.

Substances are natural or manufactured chemical elements and compounds. Although much pollution has been reduced, countless chemicals whose origin, effects and behaviour are only partly known are still found in the environment. Against this background the testing of new substances on the market, but also of well-known ones, for their environmental compatibility plays a central role.

The same applies to nano materials whose wide number of application possibilities could prove to be positive for the environment as well as posing a certain danger for human beings and the environment. Research findings help to gather experience and to estimate possible dangers and thus contribute to the safe use of these technologies.

Share of hitherto assessed chemicals

100% = 4638 OECD registered substances, of which annually at least 1000 tonnes are produced



Source: OECD

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More about this topic:

www.environment-switzerland.ch/chemicals
www.ta-swiss.ch

9 Biotechnology

At the end of 2009, 60% of activity in the field of biotechnology in closed systems dealt with *genetically modified organisms* and 40% with pathogenic organisms.

In 2009, 237 notices and applications for work with genetically modified or pathogenic organisms in closed systems were registered.

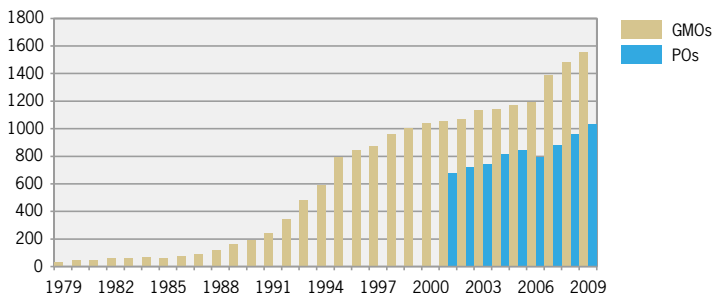
In 2009, no new applications were made for the experimental release of genetically modified plants. Three already approved experiments involving the trial release of genetically modified plants were carried out.

Activity involving *genetically modified* or pathogenic organisms is strictly regulated in Switzerland. The principal aim of legislation in this respect is to protect human health and the environment. In addition, apart from ethical issues, freedom of choice for consumers has to be taken into account and preservation of biodiversity has to be guaranteed.

Biotechnological research in laboratories and production within closed systems are extremely important for Switzerland. Comparatively few permits have been issued for the release of genetically modified and pathogenic organisms, as is also the case for the introduction of such products on the open market.

Activities with *genetically modified organisms* (GMO) and pathogenic organisms (PO) in closed systems

Number of activities



Source: Federal Office for the Environment

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More about this topic:

www.environment-switzerland.ch → Topics → Biotechnology

10 Waste and contaminated sites

In 2008, 733 kg of municipal waste was produced per person. In 1990 this figure was 603 kg per person.

Mineral construction waste, with 10 million tonnes per year, constitutes the largest amount of waste. 80% of it is recycled.

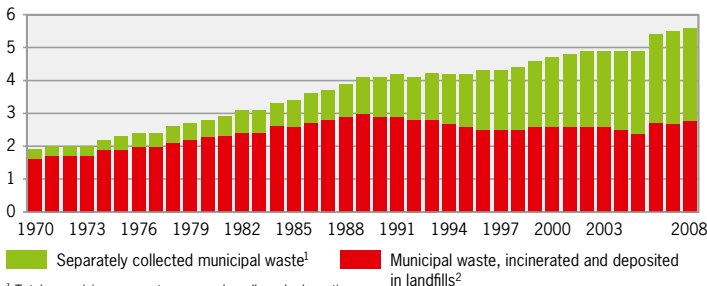
In Switzerland there are some 50,000 polluted sites where waste has been landfilled or has seeped into the ground. Around 4,000 of them are classified as *contaminated*.

Sooner or later every product becomes waste. In the area of waste treatment, Switzerland now has an efficient infrastructure, high standards and clear legislative stipulations. The manufacture, transport and use of products often cause much greater environmental damage than their disposal according to these stipulations.

Contaminated sites present a different picture. Careless handling of environmentally hazardous substances and wastes over many decades has left its mark on the substratum. In the coming decades we will be concerned with the sustainable remediation of the contaminated sites.

Municipal waste

Million tonnes



¹ Total comprising compost, paper and cardboard, glass, tin, aluminium, PET, textiles, batteries (since 1993), electrical and electronic devices (since 2001).

² The figures from 2004 include only domestic waste without imports.

Source: Federal Office for the Environment

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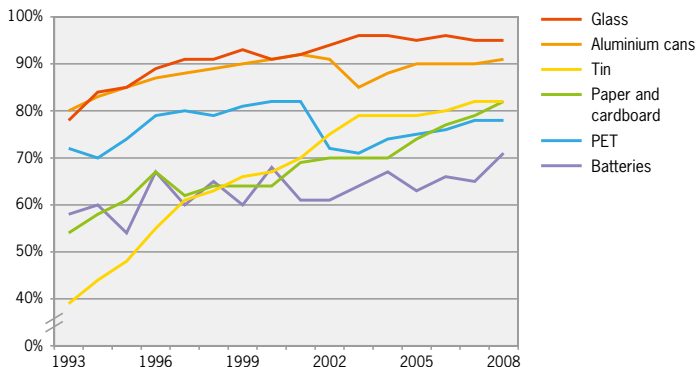
More about this topic:

www.environment-switzerland.ch/waste

www.environment-switzerland.ch/contaminatedsites

Separately collected municipal waste (recycling)

Percentage collected

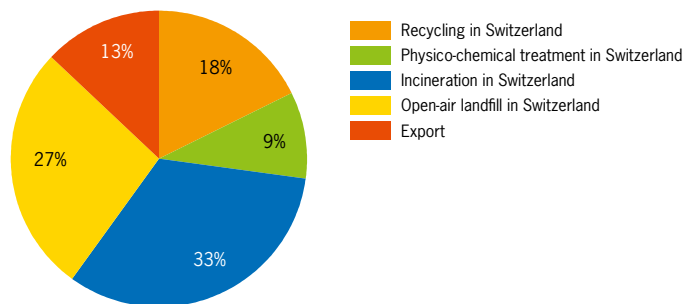


Source: Federal Office for the Environment

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Hazardous waste

Treatment of hazardous waste, 2008



Total: 1,765,773 tonnes

Source: Federal Office for the Environment

© FSO

11 Landscape and spatial development

Over the past 24 years, settlement areas have increased by 23% in western Switzerland¹.

Between 2001 and 2007, the degree of landscape fragmentation rose by 9%.

At the beginning of 2010, 4% of the total surface area of Switzerland was strictly protected. (e.g. national park, swamp and moorland).

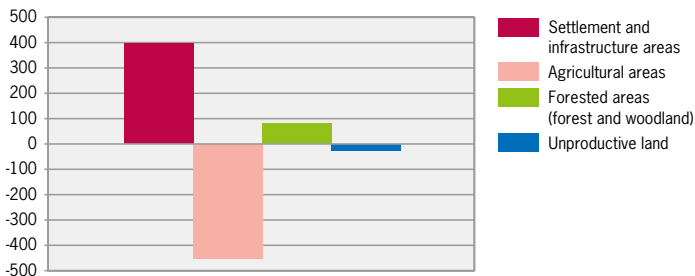
Switzerland is rich in natural and rural landscapes, which play an important role in maintaining the standard of living and are a major resource for tourism.

The intensive use of the land exerts considerable strain on the landscape, however. The increase in the expansion of built-up areas and of transport infrastructure is often achieved at the expense of agricultural areas. At the same time, the tendency to fragment the landscape more and more prevents wild animals from moving freely in their natural habitats. It is exactly this freedom of movement, however, which is an important prerequisite for reproduction and thus for maintaining the species.

¹ Basis for data: 52% of surface area. Investigations are underway for the rest of Switzerland.

Land use change over 24 years

In square kilometres, data base: 52% of Switzerland surface area (West), 1983–2007



Source: Federal Statistical Office

© FSO

More about this topic:

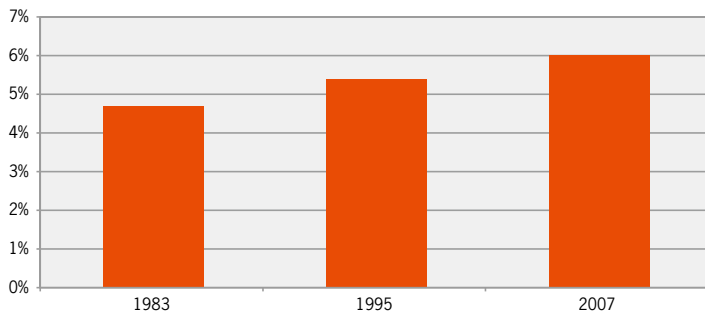
www.environment-stat.admin.ch

www.landuse-stat.admin.ch

www.environment-switzerland.ch → Topics → Landscape

Soil sealing

Proportion of sealed areas as a percentage of total area, data base:
52% of Switzerland surface area (West)

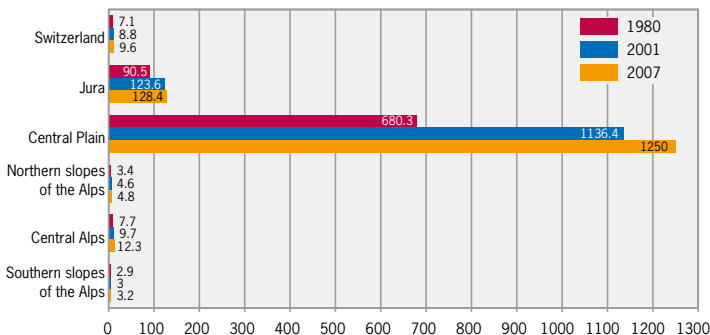


Source: Federal Statistical Office

© FSO

Landscape fragmentation

Effective mesh density (number of meshes per 1000 square kilometres),
taking account of roads down to class 4.



Source: Federal Office for the Environment, Landscape Monitoring Switzerland

© FSO

12 Forest and timber

31% of Switzerland is covered by forest.

In 2008, 1.5% of the CO₂ emissions produced in Switzerland were absorbed by the increase in living and dead biomass in the forest (sink performance).

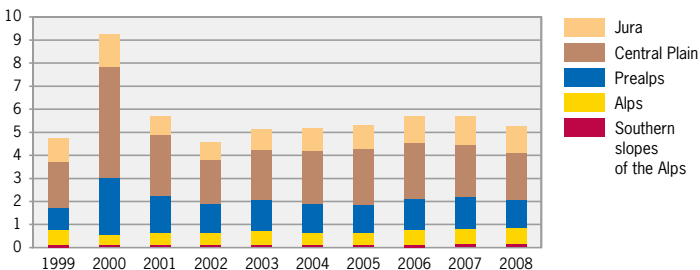
Between 1995 and 2006, 94% of the renewable timber in Swiss forests was harvested.

The forest fulfils a multitude of functions and is expected to meet many demands. Forests offer protection from natural hazards such as avalanches, rock fall and landslides. They are an essential part of the Swiss landscape and are important for leisure and recreation activities. Forests provide an irreplaceable habitat for animals and plants. In addition the forest is extremely important for the climate (among other things as carbon absorbers) as well as for air and water quality.

The forest provides an economic service in the form of the resource timber: Timber is a renewable raw material and an energy carrier with many advantages. Responsible forestry is an important part of sustainable raw material provision. A multi-functional forest management can ensure the compatibility of timber production with other products and services of the forest, thus enabling the forest to fulfil its protective, social and economic functions in the long term.

Timber output by forestry zone

Millions of m³



Year 2000: Increase in timber output was a consequence of the Lothar storm at the end of December 1999.

Source: Federal Statistical Office

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More about this topic:

www.statistics.admin.ch → Topics → Agriculture, forestry
www.environment-switzerland.ch/forest
www.lfi.ch

13 Soils

According to estimates, between 1995 and 2007, 0.9 square metres of agricultural land disappeared in Switzerland every second¹.

Between 1992 and 1996, about 15% of the analysed soils in Switzerland contained excessive levels of at least one heavy metal.

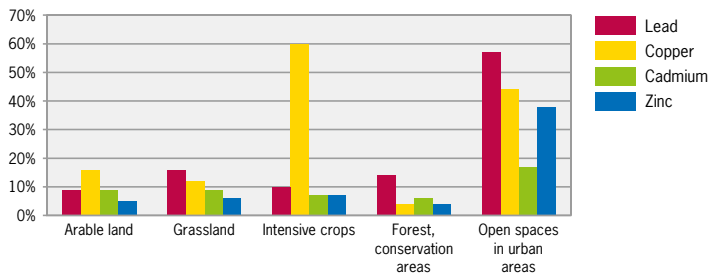
According to calculations based on models, 61% of all agricultural land is at risk of some degree of erosion and 17% is at serious risk of erosion.

The soil is a vital natural resource for mankind and for millions of organisms. Whereas air and waters are likely to recover in a matter of weeks or a few years upon removal of a pollution source, soils often need centuries to regain a healthy condition. Pollutants that enter the ecological cycle, such as heavy metals and organic compounds which are difficult to break down, accumulate in the soil where they may obstruct important functions of the soil and enter the food chain through plants. They may subsequently harm animal and human health through direct or indirect consumption. In addition to these chemical processes, the fertility of the soil may also be affected through physical processes such as erosion or compaction.

¹ Basis for data: 52% of surface area (western Switzerland). Investigations are underway for the rest of the country.

Soil contamination

Threshold value exceedences shown according to land use in about 14,000 cantonal and national measurement stations, 1990–1996



Source: Federal Office for the Environment

© FSO

More about this topic:

www.environment-switzerland.ch/soil
www.soil.ch

14 Air

The threshold values for the *immissions* of nine out of twelve air pollutants are respected in the whole of Switzerland. This is not the case with ozone (O_3), nitrogen dioxide (NO_2) and fine dust particles (PM_{10}).

In 2005, 40% of the population was exposed to an above threshold value concentration of fine dust particles (PM_{10}) at their place of residence.

The overall health cost of air pollution in Switzerland totalled CHF 5.1 billion CHF in 2005.

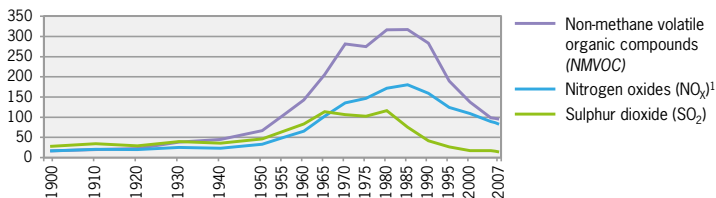
The *emission* of pollutants from transport, households, industry and agriculture has a negative impact on air quality. The main pollutants are nitrogen oxides (NO_x), particulate matter (PM_{10}), non-methane volatile organic compounds ($NMVO$ C), ammonia (NH_3), sulphur dioxide (SO_2), and ground level ozone (O_3).

Since the mid-1980's the quality of the air in Switzerland has considerably improved thanks to the measures introduced to maintain clean air. This trend has flattened out in recent years. Today air pollution remains below most of the threshold values. This is not the case, however, with ozone, nitrogen dioxide (NO_2) and fine dust particles.

Air pollutants can cause diseases of the respiratory tract and of the cardiovascular system in humans, as well as lead to an increase in the risk of cancer. Whole ecosystems are damaged through excess nitrogen and acidification. Air pollution *emissions* can be reduced by improving combustion processes (in particular for wood-burning heating systems), reducing ammonia emissions in agriculture and avoiding solvent leakage ($NMVO$ C).

Emissions of air pollutants

Thousand tonnes



¹ NO_x comprises NO and NO_2 . Emission values are given in NO_2 .

Source: Federal Office for the Environment

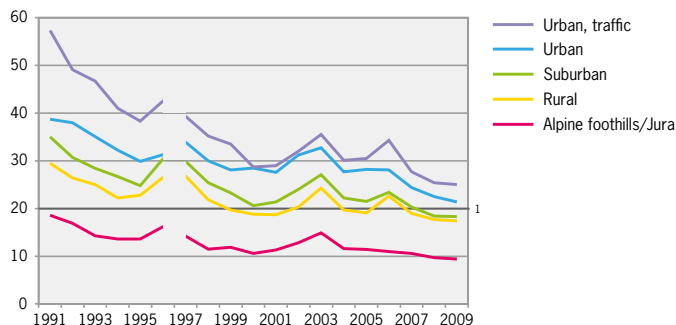
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More about this topic:

www.environment-switzerland.ch/air
www.cerclair.ch

Concentration of particulate matter (PM10)

Annual mean in micrograms per cubic metre



Data prior to 1997 was collected by a different method.

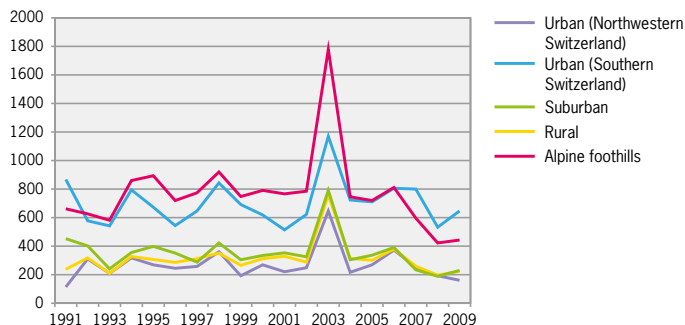
¹ Threshold limit (annual mean): 20 micrograms per cubic metre

Source: Federal Office for the Environment

© FSO

Ozone concentration

Number of hours with exceeded threshold value²



In 2003 the ozone level was extremely high owing to the persistent high summer temperatures.

² Threshold value (hourly mean): 120 micrograms per cubic metre

Source: Federal Office for the Environment

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15 Climate

Six out of seven of the warmest years since 1880 were in the last 10 years.

Emissions of greenhouse gases rose by 0.5% between 1990 and 2008 (the aim according to the Kyoto Protocol is to reduce greenhouse gases by 2008-2012 to a level of 8% below that of 1990 incl. forest sinks and certificates).

Between 1990 and 2009, the tongue of the Grosser Aletsch glacier receded by about 770 metres.

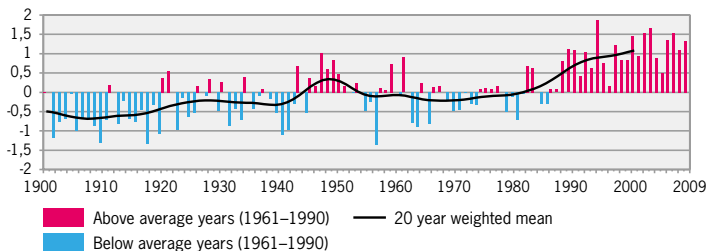
With greenhouse gas emissions continuing to increase, man is visibly influencing the earth's climate system; this can be seen by rising temperatures which exceed the natural range. The emissions are mainly from transport (especially road transport), households (heating of homes and warm water) and industry.

As a result of higher temperatures, climate experts predict a change in rainfall patterns and a rise in sea-level in the future. The consequences for society and the economy are various; aspects such as water resources, tourism, agriculture, energy, health, insurance and infrastructure are likely to be particularly sensitive to such change.

A reduction in greenhouse gas emissions (e.g. by more efficient use of energy and greater use of low-emission energy sources) can reduce human influence on the climate system. The negative consequences of climate change can be limited by taking measures to adapt to changing climatic conditions.

Temperature changes

Deviation from the long-term mean (1961 to 1990), in degrees Celsius



Source: MeteoSwiss

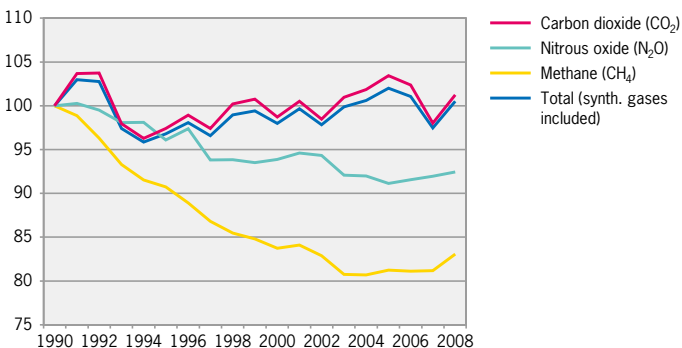
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More about this topic:

www.environment-switzerland.ch/climate
www.meteoswiss.ch → Climate
www.proclim.ch

Greenhouse gas emissions

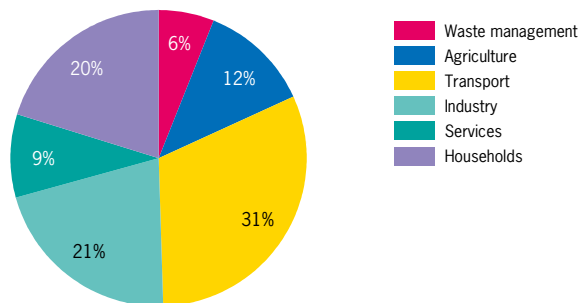
Index 1990=100



Source: Federal Office for the Environment

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Greenhouse gas emissions by source, 2008



Source: Federal Office for the Environment

© FSO

16 Water

In agricultural and populated areas the concentration of crop protection agents in groundwater exceeded tolerance levels in 8% of the monitoring stations in 2008.

In terms of phosphor pollution the water quality of surface waters has greatly improved since the 1970's.

Some 22% (about 14,000 km) of all watercourses in Switzerland are severely obstructed, straightened or narrowed; around 100,000 artificial sills and ditches affect fish migration.

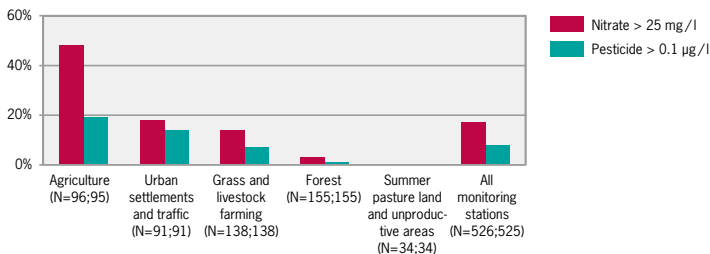
Human activity affects water in many ways and consequently great strain is placed on this resource.

In addition to the introduction of organic trace-elements (e.g. pesticides or drugs), interventions such as watercourse corrections, control structures and culverts as well as changes in flow rates downstream from hydro-electric power stations (too little residual flow, water surges) compromise the function of flowing waters as species-rich habitats.

Around 80% of our drinking water comes from groundwater and some 20% from lakes. It is therefore essential that we treat groundwater in a careful and responsible way. In agricultural areas in particular the levels of nitrates and crop protection agents measured in the groundwater are often still too high. In addition the water contains other undesirable substances, which are mainly the product of built-up areas, as well as hydrocarbons produced by transport, industry and manufacturing.

Nitrate and pesticide concentrations in groundwater, 2008

Proportion of stations with values exceeding the requirements of the Water Protection Ordinance, by main land use



Source: Federal Office for the Environment

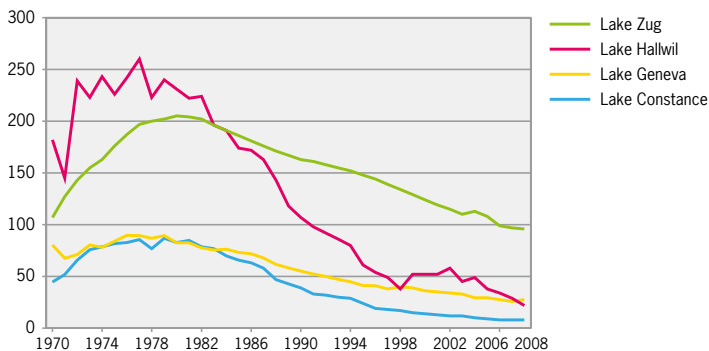
© FSO

More about this topic:

www.environment-switzerland.ch/water
www.svgw.ch

Phosphorus levels in selected lakes

Yearly average in micrograms per litre

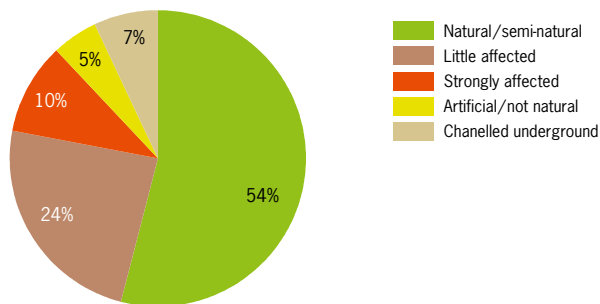


Source: Federal Office for the Environment

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Watercourse structures, 2006

Share of watercourse kilometres, in %



Source: Federal Office for the Environment

© FSO

17 Biodiversity

Some 50,000 different species of plants, fungi and animals are known in Switzerland. However, the total number of living species in Switzerland is estimated to be as high as 75,000.

36% of approximately 12,700 plant, fungal and animal species which were the subject of research, are on the red list (missing or extinct, endangered).

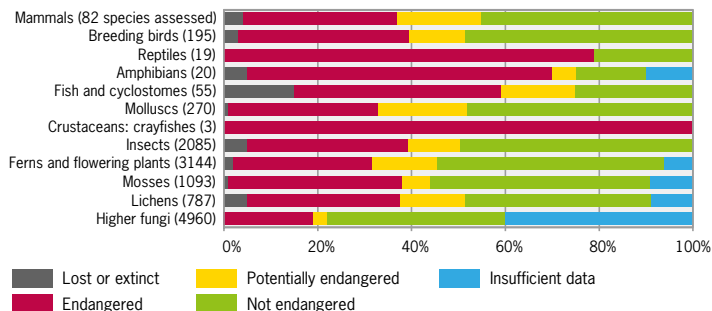
The spread of around 100 invasive species is causing growing concern.

The variety of types of landscape found in Switzerland provides a multitude of different habitats for flora and fauna, thus creating favourable conditions for a rich *biodiversity*. Human activity puts considerable strain on the variety of species, however. While landscape modification by man can certainly create habitats for new species as well, the increasing standardisation and intensive use of the landscape is inevitably leading to a decline in populations and ultimately to the loss of some species.

Foreign organisms introduced by human hand can also cause radical ecological damage if they spread invasively at the expense of native flora and fauna.

Species lost, endangered, possibly endangered or not endangered

Status 1994 to 2008, depending on the species groups



Source: Federal Office for the Environment

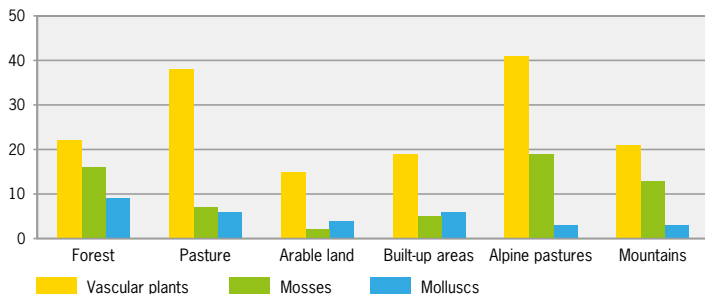
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More about this topic:

www.environment-switzerland.ch → Topics → Biodiversity
www.biodiversitymonitoring.ch
www.vogelwarte.ch

Number of species in different habitats

Mean number of species within an area of 10 m², survey period 2004–2008¹



¹ Molluscs: 2003–2007

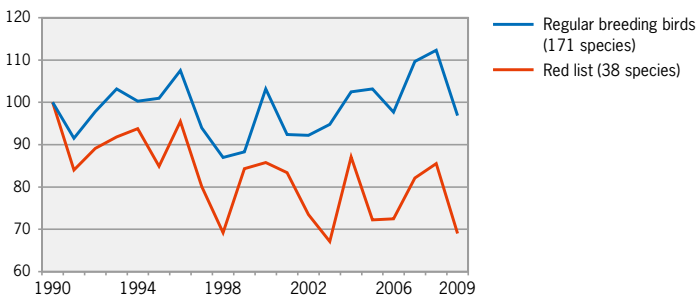
Aid to understanding: in Swiss forests an average of 22 species of vascular plants can be found within an area of 10 m².

Source: Federal Office for the Environment

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Populations of breeding birds – Swiss Bird Index®

Index 1990=100



Aid to understanding: No trend can be detected for all of the 171 evaluated species of birds regularly breeding in Switzerland. As far as the endangered and rare species on the red list (2001) are concerned, large fluctuations within a low population level are observed.

Source: Swiss Ornithological Institute Sempach

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18 Natural hazards

On average 9 people die each year in no-fault accidents caused by natural disasters (6 in avalanches, 2 through floods and 1 through rock falls).

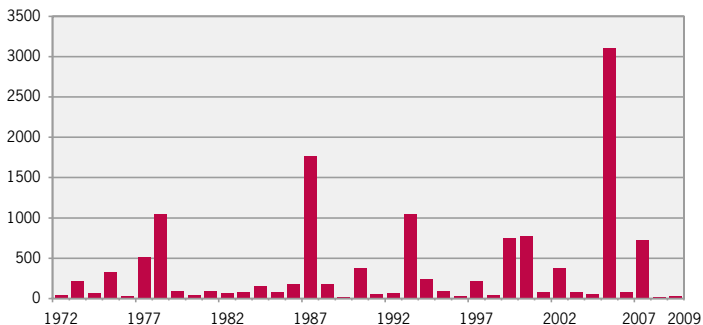
In the last 20 years, natural disasters have caused material damage costing an average of CHF 400 million per year.

About two-thirds of the hazard maps required for the planning of preventative measures have been drawn up.

Natural hazards such as flooding, mudflows, avalanches, rock falls and landslides have always existed in Switzerland; however in recent decades they have caused greater damage than usual. This is partly due to extreme weather events and partly to increased vulnerability in areas at risk. The latter can be explained by increased housing development in these regions and the proliferation of goods and infrastructure brought about by a rise in the standard of living. Spatial planning together with technical and organisational measures can help to protect people, goods and property.

Costs of storm damage in Switzerland (floods, mudflows, landslides and rockfall¹)

Data adjusted for inflation (base year 2009), in CHF million



¹ Rockfall taken into account since 2002

Source: Swiss Federal Institute for Forest, Snow and Landscape Research (WSL)

© FSO

More about this topic:

www.environment-switzerland.ch → Topics → Natural hazards
www.wsl.ch

19 Eco-efficiency

CO₂ emissions into the atmosphere rose by 1% compared with 1990. In 2008 emissions amounted to some 45 million tonnes.

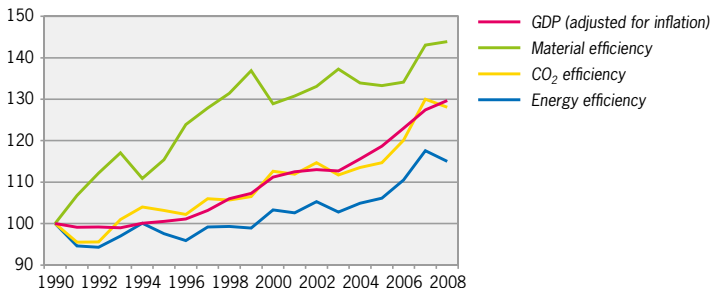
Economic performance (measured by GDP) rose between 1990 and 2008 by 30% (adjusted for inflation).

CO₂ efficiency rose by 28% between 1990 and 2008.

The eco-efficiency of a national economy measures economic performance (e.g. using gross domestic product, GDP) against environmental pollution (e.g. use of energy, materials and CO₂ emissions): the larger the amount of money generated per unit of energy, materials or CO₂ emissions, the higher the efficiency. An increase in domestic eco-efficiency can have several explanations: on the one hand the use of technologies that are more environmentally friendly, so that fewer resources are used or fewer emissions released for the same output. On the other hand structural changes may reduce domestic pressure on the environment e.g. the growing importance of the services sector or the relocation of environmentally harmful production methods abroad.

Energy efficiency, CO₂ efficiency and material efficiency

Index 1990=100



Sources: Federal Statistical Office; Federal Office for the Environment; Federal Office of Energy

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More about this topic:

www.environment-stat.admin.ch

www.environment-switzerland.ch → Topics → Economy

20 Material flows

In 2008, the total material requirement (TMR) was just under 45 tonnes per person.

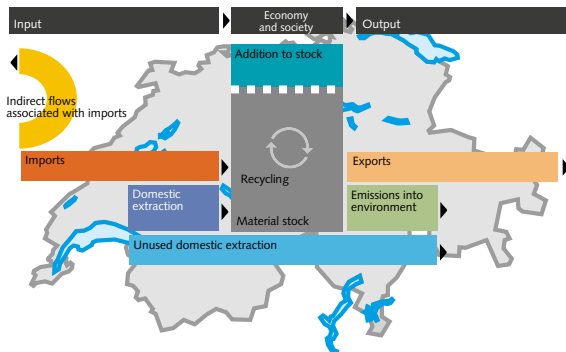
In 2008, 70% of the required natural resources come from abroad or are used abroad, in order to produce our imports.

In 2008, Switzerland's "material stock" (goods, buildings, infrastructure) was enlarged by 56.6 million tonnes. This is equal to approximately 7.3 tonnes per person.

There exists a direct link between the volume of materials consumed and environmental pollution caused, since sooner or later these materials return to the environment in the form of *emissions* or waste.

The strain exerted by a country on the environment can be quantified through material flow analyses. This involves comparing the materials that enter the economic chain (domestic extraction and imports) with the materials that leave it (exports and emissions) – with the exception of water and air. The input side also includes domestic extracted materials which do not enter the economic chain (e.g. straw that remains lying on fields or excavated material). Finally, indirect flows associated to imports are also taken into account. This includes all materials needed in the originating country in order to manufacture and transport Swiss imports of raw materials and goods.

Material flows



Source: Federal Statistical Office

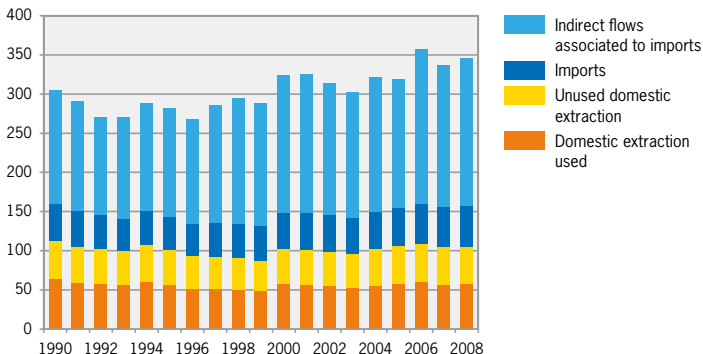
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More about this topic:

www.environment-stat.admin.ch

Total material requirement (TMR)

By type of material flow, in million tonnes

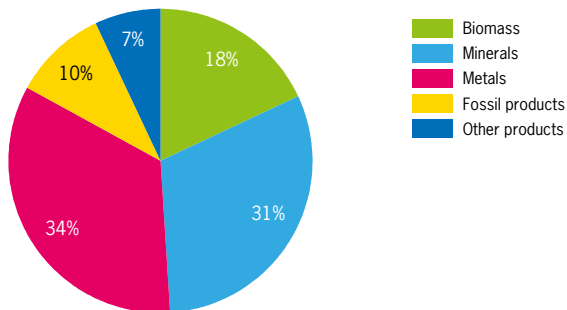


Source: Federal Statistical Office

© FSO

Total material requirement (TMR)

By category of material¹, 2008



¹ The categories also include material needed abroad for the production of imports (e.g. iron incl. iron ore).

Source: Federal Statistical Office

© FSO

21 Environmental protection expenditure

In 2007, public expenditure for the protection of the environment amounted to CHF 3.8 billion. Net expenditure (less revenue from sewerage and waste taxes) was almost CHF 1.2 billion.

Total environmental protection expenditure in Switzerland (including businesses and households) was CHF 5.9 billion in 2003. This is 1.6% more than in 1993 (adjusted for inflation).

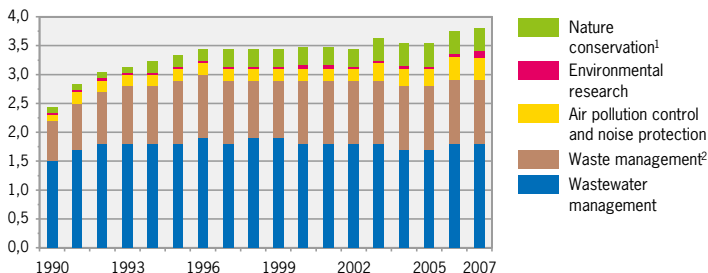
In 2003, Swiss industry devoted 1.4% of its gross value added for environmental protection. This corresponds roughly to the proportion observed in the industry of the EU15 countries.

Environmental protection is a major issue, driven by our desire to maintain an intact environment and growing awareness of the effects of our actions upon it. Although environmental protection also has its price, it helps, in particular in the public health sector, to avoid costs which would arise through a high level of environmental pollution.

Moreover, efforts aimed at protecting the environment help to achieve economic growth and technological progress. The eco-industry sector, which has expanded over the past few years, is proof of this: this sector covers all activities linked with the provision of goods and services that help to reduce environmental pollution.

Public environmental protection expenditure

At current prices, in CHF billion



¹ Since 1993: incl. governmental agri-environment subsidies.

² Excl. domestic waste incinerators.

Source: Federal Statistical Office

© FSO

More about this topic:

www.environment-stat.admin.ch

22 Environmental taxes and fees

The proportion of revenues from environmental taxes of all taxes and social security contributions in 2008 was about 6%.

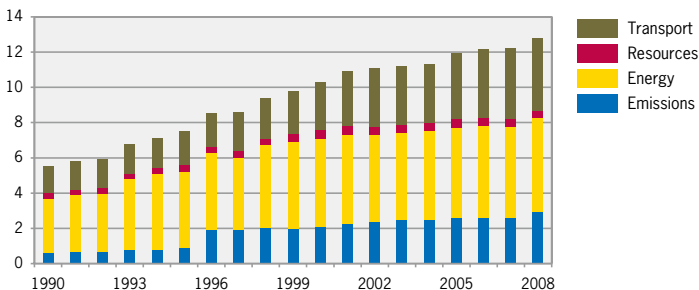
In 2008, approximately 25% of revenue from environmental taxes and fees was environmental in the “narrower sense”, i.e. arising from an environmental matter.

Cost coverage of public expenditure on wastewater treatment rose from 43% to around 75% between 1990 and 2007 (increasing application of “polluter pays” principle).

Environmental taxes and fees include various kinds of taxes and fees on items which have an impact on the environment such as waste (e.g. rubbish bag tax), energy (e.g. mineral oil tax) or traffic (e.g. performance-related heavy vehicle fee, LSVA). A tax is considered as “environmental in the narrower sense” if its introduction or application arises from an environmental issue. Revenue from environmental charges comes mainly from taxes and fees. Environmental taxes and fees make environmentally hazardous goods and services more expensive, therefore encouraging consumers and manufacturers to consider the ecological dimension when making consumer and production decisions. They also favour the increasing application of the “polluter pays” principle.

Revenues from environmental taxes

According to domain, in CHF billion



Source: Federal Statistical Office

© FSO

More about this topic:

www.environment-stat.admin.ch

23 The environment in European comparison

	CH ¹	FR	DE	IT	AT	BE	NL	DK
Population density, 2007 (per km ²)	189	101	230	201	100 ²	350	485	127
Gross energy consumption per person, 2007 (tonnes oil equivalent per person)	3.6	4.3	4.1	3.1	4.1	5.4	5.2	3.8
Share of renewable energies in gross energy consumption, 2007	18.2%	7.0%	8.3%	6.9%	23.8%	3.1%	3.6%	17.3%
No. of cars per 1000 inhabitants, 2007	525 ³	490 ²	566	600 ²	512	477	452	380
Household waste, 2007 (kg per person)	724	541	564	550	597	492	630	801
Share of organic farming area in total utilised agricultural area, 2007	11.0%	2.0%	5.1%	9.0%	11.7%	2.4%	2.5%	5.2%
Emissions of greenhouse gases, 2007 (tonnes per person)	6.8	8.4	11.6	9.3	10.6	12.4	12.7	12.2
Emissions of nitrogen oxide, 2006 (kg per person)	11.0	21.4	16.9	18.1	27.2	26.4	19.0	34.1
Threatened bird species as percentage of all known bird species (latest data available)	36%	19%	27%	18%	28%	25%	22%	16%
Threatened mammal species as percentage of all known mammal species (latest data available)	33%	19%	38%	41%	22%	36%	19%	22%
Share of environmental taxes in total tax and social contribution revenue, 2007	6.5%	4.9%	5.7%	6.0%	5.8%	4.8%	9.9%	12.1%

¹ Switzerland (CH), France (FR), Germany (DE), Italy (IT), Austria (AT), Belgium (BE), Netherlands (NL), Denmark (DK)

² Situation 2006

³ Situation 2008

Sources: Federal Statistical Office; OECD; Eurostat

More about this topic:

www.atlasofeurope.bfs.admin.ch (interactive statistical atlas of European regions)

GLOSSARY

Biodiversity

Biodiversity (biological diversity) includes genetic diversity (within a population or among individuals of the same species), species diversity and habitat diversity.

Contaminated sites

Polluted sites of facilities, accidents and landfills that have been proven to cause harmful or noxious impacts upon the environment or for which there is a risk that such impacts may arise.

CO₂-efficiency

$$= \text{GDP} \div \text{CO}_2 \text{ emissions}$$

DMC (Domestic Material Consumption)

A country's domestic consumption of materials, i.e. the domestic extraction of materials domestically used plus imports minus exports.

Emissions

The release of pollutants, noise or radiation from natural sources or by humans into the environment.

Energy efficiency

$$= \text{GDP} \div \text{final energy consumption}$$

Final energy

The energy procured or produced by consumers in order to receive a certain utility, such as electricity for light or petrol for mobility. Final energy refers to the final link in the trading chain.

GDP (Gross Domestic Product)

GDP is used for measuring a country's economic performance over a period of one year.

Genetically modified organisms (GMOs)

Organisms (animals, plants, fungi, microorganisms) whose genetic material has been modified in a way that does not occur in nature by crossing or natural recombination.

Greenhouse gases

The Kyoto Protocol regulates the following greenhouse gases or groups of gases; carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆).

Hazardous waste

Waste which due to its composition and its physiochemical or biological characteristics requires special technical and organisational measures for its environmentally acceptable disposal.

Immissions

Levels of air pollutants, noise, vibration or radiation at their point of impact.

Material efficiency

$$= \text{GDP} \div \text{DMC}$$

NM VOC (Non Methane Volatile Organic Compounds)

Volatile organic compounds that exclude methane and FCKW and are precursors for the formation of ozone, summer smog and PM₁₀.

PM₁₀ (Particulate Matter <10 µm)

Dust particles with a diameter of less than 10 microns.

Renewable energies

Energy sources that are available for an unlimited period on a human timescale. They include the use of hydropower, solar energy, ambient heat, biomass, wind energy, the renewable fractions of solid wastes, and the energy extracted from sewage treatment plants.

TMR (Total Material Requirement)

The total material requirement of a country measures the total volume of materials obtained from natural sources (with the exception of water and air).

