
Keywords: 8CH/agriculture/Capreolus capreolus/Cervus elaphus/chamois/development/economy/environmental impact/farming/fisheries/forest/forestry/game/hunting/impact/land use/Malme/management/red deer/roe deer/Rupicapra rupicapra/statistic/statistics/sustainability

Abstract: Figures of production and consumption in and basic information on agriculture, forestry, hunting and fisheries in Switzerland. Topics include agricultural land use, vegetable and animal production, environmental impacts and measures taken against it, farming methods, forest operations and timber balance, sustainable management, employment and development.
1.3.2 AGRICULTURE, FORESTRY, HUNTING AND FISHERIES

Agriculture
a) Fundamentals
Agricultural production has undergone profound structural changes over the last few decades. In the fifties and sixties, the number of farms fell on average by around 2% annually and in the seventies and eighties by around 1%. In the 1990s the rate of this decrease rose to over 2%. Since 1992/93 and increasingly since the adoption in 1996 of the new agricultural article of the Federal Constitution, agricultural policy has become more commercially and environmentally oriented, with environmentally friendly farming methods playing a greater role.

b) Farm sizes
Between 1990 and 2000 the number of farms fell from 92'815 to 70'537, while the average farm size increased over the same period by around 33%, reaching 15.3 ha by 2000. The number of smallholdings (0 to 3 ha) decreased by almost 58% between 1990 and 2000 while the number of relatively large farms (over 20 ha) increased by 32%.

c) Agricultural land and livestock
According to the agricultural census of 2000, the area given over to agriculture amounted to 1'076'45 ha or 26.1% of the area of Switzerland. Added to this are the Alpine areas available for farming (the figure for the area given over to agriculture does not include summer pastures) which in 1999 amounted to around 537'801 ha or 13% of the area of Switzerland. Swiss climatic and topographical conditions mean that the proportion of permanent grassland is high. In 2000 it amounted to 69.6% of agricultural land, with open arable land accounting for 292'547 ha (Fig. 1.3.2a). The major part of this land, 182'669 ha to be precise, was used for growing cereals. In 1990 cereals were still grown on 211'485 ha, giving a decrease in agricultural land used for this purpose of 14% over 11 years. The area given over to the cultivation of fodder maize and potatoes has also decreased. In contrast, however, the area planted with the fodder crops soya, peas and fodder beet has increased.

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4 Swiss Federal Statistical Office 2001b, p. 16.
5 Swiss Federal Statistical Office 2001a. The area under cultivation varies from year to year depending on external circumstances, comparisons between two consecutive years being therefore not very meaningful. Over a ten year period, however, a general trend becomes apparent.
Categories of agricultural land use 2000

- Grazing land: 69.6%
- Cereals: 17.1%
- Other open arable land: 5.3%
- Potatoes, sugar beet, fodder beet: 3.2%
- Perennial crops: 2.2%
- Oil-seed crops: 1.6%
- Other agricultural land use: 1.1%

Livestock numbers 2000

- Chickens: 1800
- Beef cattle: 1300
- Pigs: 700
- Sheep: 400
- Geese, ducks, turkeys: 200
- Goats: 100
- Horses etc.: 50

Contribution of primary sector to total value added at current prices

<table>
<thead>
<tr>
<th>Year</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>3.0</td>
</tr>
<tr>
<td>1991</td>
<td>2.8</td>
</tr>
<tr>
<td>1992</td>
<td>2.6</td>
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<tr>
<td>1993</td>
<td>2.4</td>
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<tr>
<td>1994</td>
<td>2.2</td>
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<tr>
<td>1995</td>
<td>2.0</td>
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<td>1996</td>
<td>1.8</td>
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<tr>
<td>1997</td>
<td>1.6</td>
</tr>
<tr>
<td>1998</td>
<td>1.4</td>
</tr>
<tr>
<td>1999</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Source: Swiss Federal Statistical Office 2001a
In 2000, livestock included 1’588’005 head of cattle (Fig. 1.3.2b) or 14% fewer than in 1990. This decrease is due in part to the problem of BSE, but also to improvements in breeding (higher milk yield per cow). The number of pigs fell by over 18% between 1990 and 2000 to 1’498’223 animals. The number of horses, sheep and goats is small relative to total livestock numbers. The biggest decrease in livestock numbers has taken place in the cattle-rich areas of central and eastern Switzerland, with the number of head of cattle per hectare dropping from 1.9 and 1.8 respectively in 1990 to 1.65 and 1.6 respectively in 1999.

d) Employment and value added

The importance of agriculture within the overall economy has been declining for decades, but the decline has become particularly marked in recent years. Where final output amounted at current prices to CHF 10.0 billion in 1990, this fell to CHF 7.6 billion in 2000. This decline is due mainly to falling prices for agricultural products and lower output. In 1999, agricultural production accounted for 1.5% of gross domestic product (Fig. 1.3.2c). In 1996, a total of 242’542 people or 4.5% of all those in employment worked in the primary sector (212’745 of these being employed in agriculture).

e) Agricultural products

In 2000 animal-based output amounted to 68.8% of the estimated value of final output, making it the most important area of agriculture. Dairy products are the most significant animal product, bringing in CHF 2’560 million, followed by meat products at 2’456 million (1’139 million for beef, 1’041 million for pork, 188 million for poultry and 88 million for other meat) and finally other animal products at CHF 199 million (Fig. 1.3.2d).

Between 1990 and 2000, the contribution of vegetable products to total agricultural output varied between 25.9 and 32.8%. The main products in 2000 were grape must, cereals, vegetables and fruit, worth CHF 540, 527, 435 and 349 million respectively (Fig. 1.3.2e). Labour-intensive fruit and vegetable cultivation has increased in significance in recent years.
f) Environmental impacts
Agriculture has a constitutional duty on the one hand to produce food cost-effectively and on the other hand to protect natural resources (soil, water, air and biodiversity) and look after agricultural land. In the agricultural sector, many near-natural areas, such as streams, low-yield pastures and field copses, have been lost (see Chapter 2.11 Landscape and Space) owing, among other things, to increasingly intensive farming practices. Matters improved between 1984 and 1995, with the planting of 11'400 new free-standing trees and 155 kilometres of new hedgerows.10

Some of the heavy metals which enter the soil and accumulate year by year come from artificial fertilisers and sewage sludge (see Chapter 2.1 Soil). Heavy metals may enter the human or animal body through food and endanger health. Plant protection agents (herbicides, insecticides, fungicides and growth regulators) may disturb soil biology, contaminate groundwater and reduce biodiversity. Consumption of plant protection agents fell between 1988 and 1996 from a total of 455 tonnes to 1,577 tonnes (see Chapter 2.1 Soil).11

Land planted with cereals, maize, potatoes, turnips, outdoor vegetables and vines in hillside locations is at risk of erosion if cultivated without due care. The total area cultivated with such erosion-endangered crops amounted to 282'963 ha in 1998, or 26% of the total area given over to agriculture (see Chapter 2.1 Soil).12

The high livestock density in central and eastern Switzerland in particular may be responsible for the contamination of soil, water and air owing to the large quantities of slurry produced. Since farmed pastures cannot fully recycle the quantities of slurry they receive, nitrates, phosphorus, potash and heavy metals accumulate in the soil, and consequently in groundwater through leaching and run-off. In addition, gases emitted by cattle contribute considerably to the greenhouse effect. Agriculture was responsible for around two-thirds of the 261'000 tonnes of methane (CH4) emissions in 1995 and for around three-quarters of the 11'800 tonnes of nitrous oxide (N2O) (see Chapter 2.2 Climate).

The agricultural nitrogen excess, i.e. the difference between input and consumption or leaching (output), has been following a downward trend for some years (Fig. 1.3.2f).13 Since 1990 it has fallen by more than 12'000 tonnes or 19%.14 Phosphorus excesses decreased between 1990 – 1992 and 1998 from close on 20'000 tonnes to 9'000 tonnes. The fall in nitrogen and phosphorus excesses are principally a result of lower livestock density, the reduced use of inorganic fertilisers and less imported feedstuff.

g) Measures taken
To qualify for subsidies, farmers have to provide proof of best environmental practice, which forms the basis for the implementation of environmental policy in agriculture. The aim is to achieve a balance of fertiliser input and output, a minimum of 7% ecological balance areas, proper crop rotation, appropriate soil protection and animal welfare together with limited and targeted application of plant protection agents.

Farmers are encouraged to meet specific environmental and animal welfare requirements through additional financial incentives. These include subsidies for ecological balance, organic farming, extensive production of cereals and rape, water protection15 and humane animal husbandry. At a total of CHF 309 million, direct ecological subsidies and subsidies for humane animal husbandry accounted in 1999 for 7.4% of the approximately CHF 4.2 billion spent by the Swiss government on agriculture and nutrition (Fig. 1.3.2g).16

Summer pasture subsidies to the tune of CHF 81.2 million were paid out in 2000 for the approximately 300'000 head of cattle that spend the summer in Alpine meadows. Using the Alpine meadows in this way helps to prevent scrub growth.

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<table>
<thead>
<tr>
<th>Nitrogen balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thousand tonnes</td>
</tr>
<tr>
<td>300</td>
</tr>
<tr>
<td>250</td>
</tr>
<tr>
<td>200</td>
</tr>
<tr>
<td>150</td>
</tr>
<tr>
<td>100</td>
</tr>
<tr>
<td>50</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

Fig. 1.3.2f
input |
output |
excess |


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12 Swiss Federal Statistical Office 2000a, pp. 32 and 79.
13 Swiss Federal Statistical Office 2000b, p.36.
14 Approximately 15% of emissions are omitted from these statistics, which do not include losses between the production of animal manure and spreading on fields.

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1.3 PRODUCTION AND CONSUMPTION

39
As part of the evaluation of environmental measures, it has been possible to demonstrate that hedges and their borders are the most species-rich of all balance areas\(^{17}\), containing an average of 45–55 plant species (compared with 20–30 per hectare in extensive and less intensive grasslands). There is no difference in the number of species found in intensive grasslands and beneath standard fruit trees, only in the types (range) of plant species. In 2001, in order to improve the quality and contiguity (networking) of ecological balance areas, the federal government paid the first subsidies for ecological balance areas that are of a particular quality or are integrated into a regional networking project.\(^{18}\)

Buffer strips increase biodiversity

In the countryside around Geneva, agreements have been reached with 41 farmers since 1991 with regard to approximately 25 ha of unsown buffer strips, hedges and flowered fallow land, in addition to ecological balance areas.\(^{19}\) Eight years on, over 300 species of plant were found in the buffer strips. The stonechat, corn bunting and greater whitethroat – all on the Swiss «red list» – have increased threefold in number.

\(^{1}\) In 1993 only cereals.
\(^{2}\) Figures for 1999.
\(^{3}\) The conversion factor is 1 are per standard fruit tree.
\(^{4}\) The PHSS programme initiated in 1996 calls for an animal farming system which permits different uses for animals. Since considerable alterations are often needed to meet PHSS requirements, participation by farmers is lower than for ROEL.\(^{5}\) Since 1993, farmers who do more than meet the minimum requirements of the animal welfare regulations are compensated financially by the ROEL programme. ROEL governs frequency of exercise, minimum pasture area and animal husbandry.

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**Table: Activities focusing on ecological factors and animal welfare**

<table>
<thead>
<tr>
<th>Activity</th>
<th>1993</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extensively and less intensively used grasslands</td>
<td>51'461 ha in total</td>
<td>78'778 ha</td>
</tr>
<tr>
<td>Flowered and rotated fallow land</td>
<td>2'334 ha</td>
<td></td>
</tr>
<tr>
<td>Hedges, field and bank copses</td>
<td>2'275 ha</td>
<td></td>
</tr>
<tr>
<td>Litter-crop meadows and buffer strips</td>
<td>3'760 ha</td>
<td></td>
</tr>
<tr>
<td>Standard fruit trees</td>
<td>1'903'574 trees</td>
<td>2'470'500 trees</td>
</tr>
<tr>
<td>Extensive cereal and rape production</td>
<td>72'960 ha(^{1})</td>
<td>87'761 ha(^{2})</td>
</tr>
<tr>
<td>Organic farming</td>
<td>18'908 ha</td>
<td>86'116 ha</td>
</tr>
<tr>
<td>Extensively used grazing on unused arable land</td>
<td></td>
<td>5'712 ha</td>
</tr>
<tr>
<td>Total area of ecological set-aside (incl. standard fruit trees)(^{3})</td>
<td></td>
<td>117'564 ha</td>
</tr>
<tr>
<td>Particularly humane stabling systems (PHSS)(^{4})</td>
<td>0</td>
<td>264'513 head of cattle</td>
</tr>
<tr>
<td>Regular turnout of livestock (ROEL)(^{5})</td>
<td>91'412 head of cattle</td>
<td>616'002 head of cattle</td>
</tr>
</tbody>
</table>

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Source: Swiss Federal Office for Agriculture 2001a

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**Picture:** Stonechat

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**1.3 PRODUCTION AND CONSUMPTION**
Forestry
a) Fundamentals

Switzerland’s total forest area (including scrub and stands of green alder or Swiss mountain pine) was 1’234’000 ha in 1993/95 as estimated by the second National Forest Inventory. The distribution of forests across Switzerland is highly variable. The Central Lowlands and the Alps have the least forest cover at 23.9% and 22.8% respectively, while the Southern Alps and the Jura are the most densely forested at 48.0% and 45.6%. The foothills of the Alps lie between the two extremes at 32.9%. Overall, 29.5% of Switzerland is covered with forest (Fig. 1.3.2h).

Since the first National Forest Inventory in 1983/85, the forest area has risen by 48’000 ha or around 4%. The differences between the regions are striking: the greatest increase (around 7.6%) was recorded in the Alps as a consequence of reafforestation of land previously used in agriculture, while the area of forest on the Central Lowlands has remained unchanged.

Forests are under great pressure in inhabited areas because new infrastructure, quarries, landfill sites and construction zones all require additional space and land is already in short supply in the remaining areas. Over the period from 1976 to 2000, the area of approved forest clearance amounted to between 85 and 210 ha per year (Fig. 1.3.2i). The largest forest clearances were approved for transport infrastructure and extraction of raw materials (gravel pits). Figures for recent years reveal that the pressure upon forests from raw material extraction is undiminished.

Spruce is the predominant species in Switzerland (48%), followed by beech (17%) and fir (15%). Together, these species account for around four fifths of tree stocks. Spruce predominates at all altitudes, accounting for 33% in lowland areas and 64% at high altitudes. Foreign tree species (exotics) account for only around 0.6% of total stocks throughout Switzerland. The only relatively common exotic, the elm, has suffered a decline of some 30% owing to elm wilt.

Near-natural stands of deciduous woodland are widespread on the southern side of the Alps and in the northern Jura, but are less common around Lake Geneva and rare in the Central Lowlands (Fig. 1.3.2j). Non-natural stands are especially common in the middle of the Central Lowlands and in some areas of the foothills of the Alps. In recent years, owing to the decline in spruce numbers, the Central Lowlands have seen a 3.1% increase in near-natural stands.

The development of a tree’s crown is today viewed as an indicator of the general stresses to which it is exposed. In 2000, 19.0% of trees were classed as damaged and 41.1% at risk (Fig. 1.3.2k). In 1990, just 15.6% were damaged and 33.4% at risk, while in 1985 only 8.6% of trees were damaged and 21.0% at risk. Damaged trees are those having lost more than 25% of their needles or leaves, while those having lost 10 – 25% of their leaves or needles are deemed to be at risk. Annual tree mortality is 0.4% or one in 250 trees. The EU Commission’s forest status report for 2000 classes 22.6% of all trees across Europe as damaged and 41.1% at risk.

13 Production and Consumption

Closeness to natural proportion of conifers in areas of deciduous forest

Fig. 1.3.2j

Source: Swiss Federal Research Institute for Forest, Snow and Landscape 1999

Very far from natural proportion
Far from natural proportion
Quite far from natural proportion
Close to natural proportion
Areas of coniferous forest

Development of crown thinning

Weighted proportion of trees with more than 25% crown thinning

Percent

1985 86 87 88 89 90 91 92 93 94 95 96 97 98 99 2000

Source: Swiss Federal Research Institute for Forest, Snow and Landscape
b) Forestry operations and timber stocks

Just over one quarter of Swiss woodland is in private hands, while 73% is in public ownership.26 The majority of publicly owned woodland, some 67.7%, belongs to boroughs and public corporations. The cantons and federal government together own only 5.4%. The average size of each public holding of woodland is 254 ha, while the corresponding figure for privately owned holdings is only 1.34 ha.

At 367 m$^3$/ha average timber stocks in Swiss forests are relatively large (by way of comparison, stocks in Finland are 86, in France 116, in Germany 271 and in Austria 266 m$^3$/ha).27 Figures for average annual growth per hectare range between 5.0 m$^3$/ha on the southern side of the Alps and 14.7 m$^3$/ha in the «Mid-Central Lowlands» economic region. Overall woodland growth throughout Switzerland amounts to 9.8 million m$^3$ annually, of which 4.0 to 4.8 million m$^3$, or nearly 50%, were utilised each year between 1991 and 1999 (Fig. 1.3.2l). However, extraordinary events may bring about a transient increase in the volume of timber used: on 26 December 1999, 12.8 million m$^3$ of timber were blown down by hurricane Lothar, nearly 5 million of which in the canton of Berne alone.28 The majority of this timber was collected and recorded as wind-throw for the years 2000 and 2001. The volume of timber used in 2000 thus amounted to 9.2 million m$^3$. A large proportion of the wood felled during the storm has been left in the forests to decay slowly to humus.

Swiss domestic timber consumption varied between 6.1 and 7.8 million m$^3$ in the period 1991 to 2000.29 One striking trend is the rising proportion of timber exported. This rise is primarily accounted for by beech, which is mainly processed in Italy. Imports rose less rapidly than timber consumption, thus resulting in a positive impact on domestic timber utilisation.

Value added in forestry was some CHF 413 million in 1995, or 0.12% of gross domestic product. In 1995 a total of 9’102 people were working in the forestry sector.30 These jobs are mainly located in peripheral regions of Switzerland.

1989 was the last year in which publicly owned forestry made a profit (a minimal CHF 1 per m$^3$ of timber used). Although it has been possible to almost halve the number of man-hours input per hectare of forest, the financial situation of forestry operations has worsened steadily owing to real falls in timber prices and rising wage costs. This has forced the authorities increasingly to subsidise the services woodlands provide to local communities.

Federal funding for forestry varies from year to year depending upon the progress made with the implementation of current projects and cantonal budget allocations, as the federal subsidies are indexed to cantonal funding (Fig. 1.3.2m). Events such as the Vivian and Lothar storms cause peaks in expenditure which differ greatly from the usual annual variations.

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c) Sustainable management

The Federal Law on Forests and the associated regulations are intended to safeguard timber production, maintain biodiversity and provide protection against natural hazards. Timber harvesting must be carried out using methods which are not harmful to the soil and tree stands. Tree species native to Switzerland should be selected, while forest regeneration should be permanent and provide small-scale units graduated in terms of age and species, while especially valuable habitats and natural objects should be protected.

Some 70% of all animal and plant species present in Switzerland are found in woodland (including forest margins and floodplain forests). The OECD’s analysis of environmental performance concludes, however, that biodiversity has declined in Swiss forests. Possible reasons are the replacement of deciduous trees with spruce, the lack of dead wood and low light levels in forests, plus the disappearance of diverse forest margins (see Chapter 2.12 Biodiversity). Some 200’000 ha of forest are located in landscape preservation zones while 30’000 ha are located in the Swiss National Park and other protected areas. A further 7’000 ha of forests are in reserves outside these protected areas. Economically motivated intervention of any kind is prohibited in the Swiss National Park, in protected biotopes and in forest reserves, i.e. in only 3.75% of the total forest area. The second National Forest Inventory carried out from 1993 to 1995 revealed, however, that 13% of total forest area (as much as 19% in the Alps) had seen no intervention for more than 50 years. For practical purposes, these areas amount to forest reserves, even though they are not formally classified as such.

Timber obtained from sustainably managed forests should be clearly marked to allow consumers to make informed purchasing decisions. Two certification systems apply in Switzerland, the FSC and Q labels. The FSC label indicates that the timber has been produced in accordance with strict environmental and social standards, and is of relevance to the international protection of forests. The Q label confirms that the timber has been produced and processed in an environmentally sensitive manner and emphasises its Swiss origin.

Between 1998 and the middle of 2001 some 65’108 ha of forest and 32 wood-processing plants in Switzerland were awarded the FSC Quality Mark; 34’279 ha of forest in 86 forestry operations and 14 sawmills had been certified in accordance with the Q label by the middle of 2001. Approximately 10’000 ha were certified in accordance with both schemes. The potential output of certified roundwood (excluding fuel wood) was expected to amount to roughly 500’000 m³ by the end of 2000, or around one tenth of the annual timber harvest. However, the proportion of this wood which was actually sold as certified timber is largely unknown.

Fisheries

The area of lakes fished professionally is over 123’000 ha. The number of professional fishermen has declined steadily over recent decades, to 376 individuals in the year 2000. At the same time, the total catch fell from 2’176 tonnes in 1980 to 1’659 tonnes in 2000 (Fig. 1.3.2n). Only a few of the 50-plus species of fish present in Swiss waters have been used by the professional fishing industry for food. Catches consisted for the most part of lake herring and perch together with various other types of whitefish. The decline in catches is most noticeable among whitefish and perch, which prefer more nutrient-rich waters (see Chapter 2.4 Water). Amateur anglers fishing the lakes caught an additional 209 tonnes in total in 1999. The total catch of
Professional fishermen and their yield of catch

![Graph showing the number of professional fishermen and their yield of catch](image)

1 The number of professional fishermen is collected every 2 years only
Source: Swiss Agency for the Environment, Forests and Landscape, unpublished

Professional fishermen and amateur anglers put together falls well short of demand: only around 5% of the fish and fish products eaten in Switzerland are of Swiss origin.

The canalisation, straightening, obstruction and underground channelling of watercourses have reduced fish habitats (see Chapter 2.4 Water). Moreover, the absence of suitable spawning grounds jeopardises the reproductive cycles of many species of fish. These waters have been stocked mainly with the fish species caught by anglers. The use of water for hydroelectric power may obstruct or even interrupt completely the river continuity essential to the preservation of migratory fish species (see Chapters 2.7 Energy, 2.11 Landscape and Space and 2.12 Biodiversity).

Water pollutants (for example untreated or inadequately treated industrial and agricultural effluents) frequently kill fish. Fish are good bioindicators as they are sensitive to changes in water quality. In addition to «conventional» pollution of clearly definable origin, diffuse pollution sources are gaining constantly in significance. The sense of direction and reproductive behaviour of fish may be impaired by hormone-like substances (produced among other things by contraceptives, drugs, detergents and pesticides) as well as by synthetic aroma substances (perfumes in personal hygiene or cleaning products) (see Chapter 2.4 Water). It is not yet possible to assess the impact of individual substances.38
Hunting

Hoofed game stocks have increased slightly in recent years. In 2000 gamekeepers and game wardens estimated there to be 128'133 roe-deer, 89'535 chamois and 23'402 red deer in Switzerland. In the same year 30'437 licensed huntsmen shot 42'210 roe-deer, 16'511 chamois and 6'997 red deer (Fig. 1.3.2o) while 14'578 roe-deer fell victim to other causes of death (7'508 being run over).

The loss of natural habitats is a threat to various wild animal species such as the common hare, capercaillie and partridge (see Chapters 2.11 Landscape and Space and 2.12 Biodiversity). Certain increasingly popular leisure activities are also having a detrimental effect on game, for example paragliding, off-piste skiing or mountain-biking in previously untouched areas (see Chapter 1.3.7 Leisure and Tourism).

1.3.3 INDUSTRY AND COMMERCE

Development

In 1998, Switzerland had some 379'000 places of work (excluding agriculture and forestry), 81'000 of which were within industry, commerce and the construction sector. The number of places of work in the secondary sector rose continuously up until 1995, and between then and 1998 dropped by 2'000. The number of employees fell by 77'000 to 1'032'000 between 1995 and 2000.

Switzerland’s corporate profile is largely dominated by small companies, i.e. with fewer than 10 employees (full or part-time). In 1998, the average number of employees per company in the secondary sector was 12.6.

Environmental impacts

In 2000, industry accounted for 20% of final energy consumption (see Chapter 2.7 Energy). Major energy consuming sectors are the paper-making and printing industry, the chemicals industry and the metal production and processing industry.

Industry generated around 15% of anthropogenic greenhouse gases (see Chapter 2.2 Climate). In addition to this, it generated various atmospheric pollutants (see Chapter 2.3 Air), for example volatile organic compounds (VOCs) produced through the use of solvents. Industrial combustion plants make a substantial contribution to sulphur dioxide emissions. The waste management sector makes a substantial contribution to other atmospheric pollutant emissions, in particular hydrogen chloride, zinc and mercury together with dioxins and furans. Emissions from the secondary sector have fallen since 1990 (Figure 1.3.3a).

Industry and commerce require water for their processes and generate waste water, the latter having to comply with certain quality requirements before being discharged into the public sewers or into watercourses. If this is not the case, the waste water must be treated by suitable methods at the point of origin.

Figures for the quantities of waste generated by industry and commerce are based largely on estimates. A proportion of industrial and commercial waste is recorded as municipal waste along with waste from household sources (see Chapter 2.5 Materials and waste). Construction waste amounted to some 3 million tonnes in 1998 and special waste to just on 970,000 tonnes. Over 1 million tonnes of waste are recycled annually, the largest proportion being accounted for by ferrous scrap. Large companies, especially in the chemicals industry, operate their own disposal facilities.