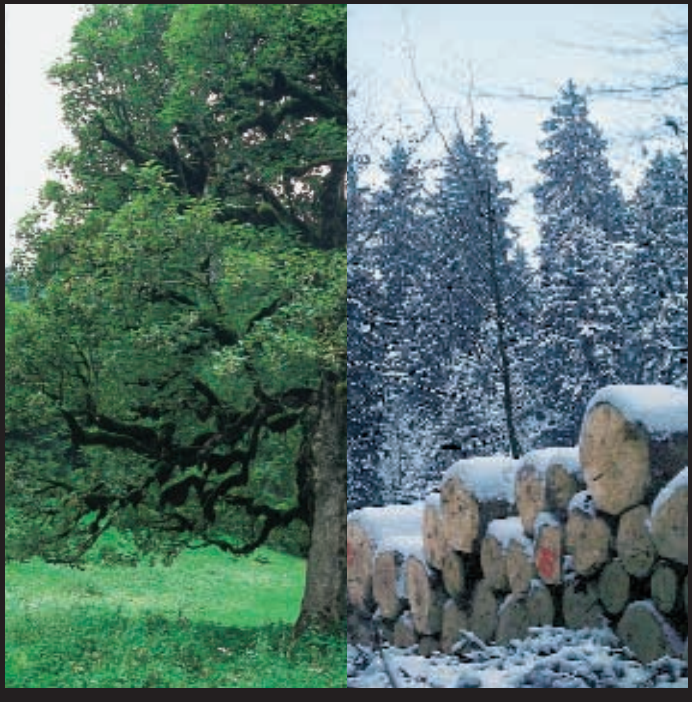
SAEFL information

FORESTS AND WOOD IN SWITZERLAND

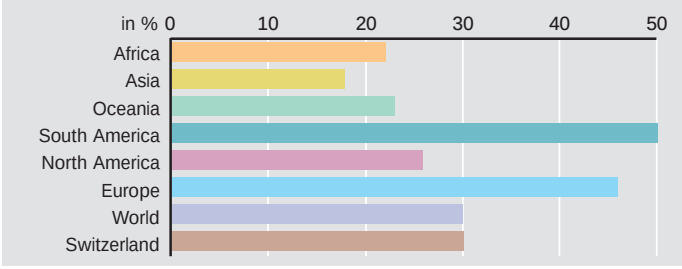
2003 Edition



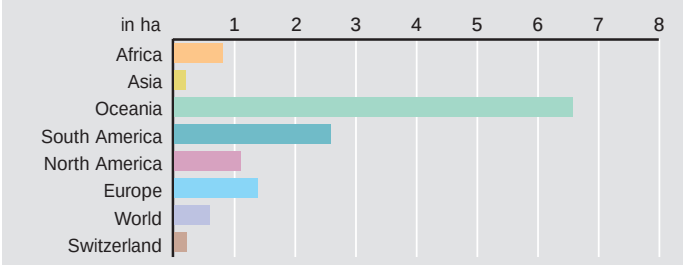
Swiss Agency for
the Environment,
Forests and
Landscape
SAEFL

FORESTS OF THE WORLD AND OF SWITZERLAND

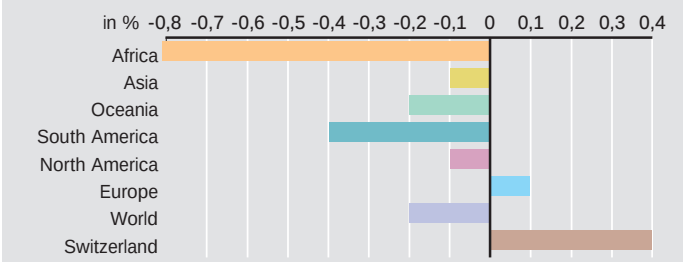
Forest as a percentage of national territory



Forest area per inhabitant in ha

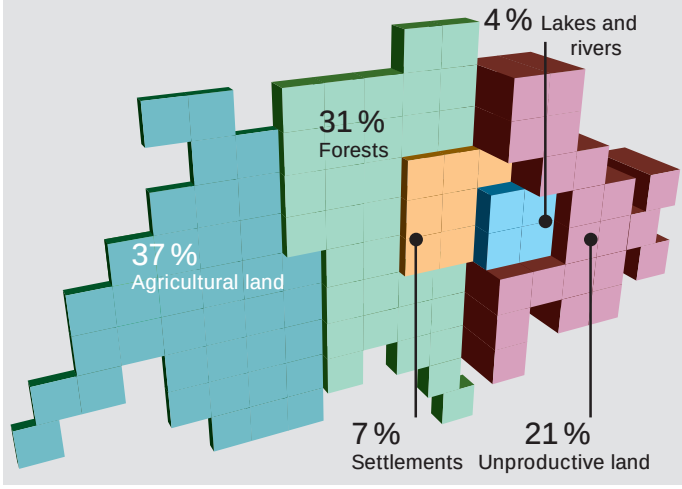


Annual change in forest area (1990–2000)

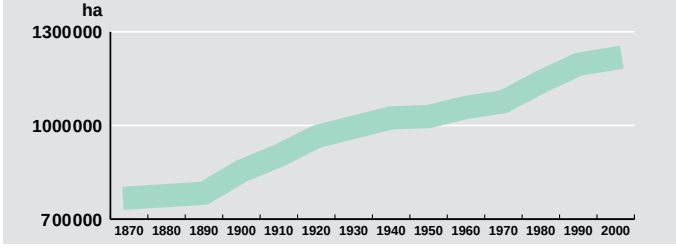


The world's forest area declines by 0.2% each year. However, forest area in Europe is increasing by 0.1% per annum and in Switzerland by 0.4% per annum.

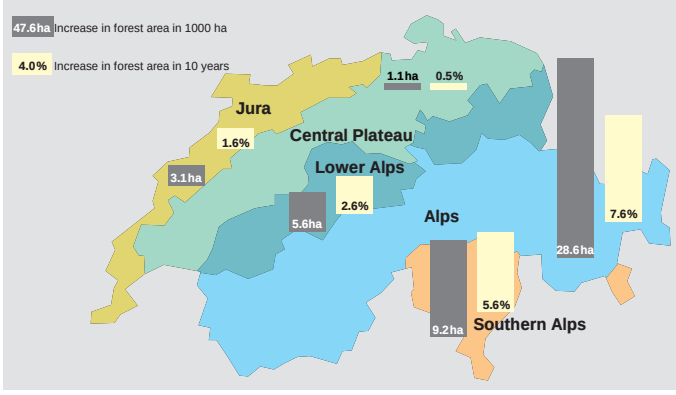
LAND USE IN SWITZERLAND [3]



DEVELOPMENTS OF FOREST AREA IN SWITZERLAND [13]



INCREASE IN FOREST AREA PER REGION [11, 1]



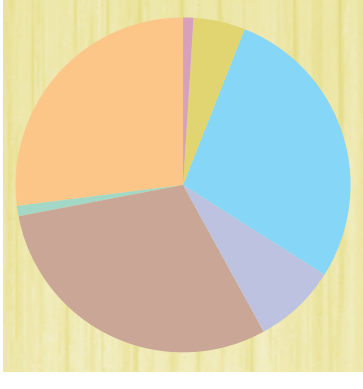
The total forest area in Switzerland in 2001 was 1219000 ha. It increased by around 47600 ha between 1985 and 1995. This corresponds to an annual increase of approximately 4800 ha or the surface area of Lake Thun.

FOREST DISTRIBUTION BY CANTON[1,2]

Canton	Total forest area in ha	% of total area	Forest area per inhabitant in a	Average ann. forest harvesting from 1991 to 2000 in 1000 m³	Harvesting per ha productive forest area in m³	Growing stock (NFI 2) in 1000 m³	Growing stock (NFI 2) in m³/ha
AG	48984	35	9	426	8,9	17968	364
AR	7197	30	13	30	4,3	4744	462
AI	4850	28	32	12	2,6	2409	603
BL	18581	36	7	97	5,4	7775	371
BS	1460	39	1	5	3,4	0	0
BE	172134	29	18	1016	6,5	75497	445
FR	41138	25	17	249	6,4	20209	489
GE	2996	11	1	4	1,4	741	318
GL	18469	27	47	65	4,1	5993	355
GR	185702	26	99	323	2,2	51704	311
JU	39128	47	57	211	6,8	13470	394
LU	39441	26	11	302	7,8	18454	471
NE	29373	37	18	168	6,2	10375	369
NW	7758	28	20	34	4,8	2445	303
OW	18421	38	58	69	4,4	6900	363
SH	12553	42	17	72	5,8	4757	380
SZ	27100	30	21	137	5,5	11259	414
SO	31906	40	13	206	7,2	11312	354
SG	54783	27	12	250	4,8	24206	457
TG	19509	20	9	162	8,4	9133	455
TI	141842	50	46	58	0,5	23031	204
UR	18813	17	54	27	2,1	5058	329
VS	110372	21	40	117	1,3	29819	277
VD	111027	35	18	443	4,7	35562	374
ZG	6124	26	6	48	8,2	2131	377
ZH	49523	29	4	454	9,2	21231	435
CH	1219184	30	17	4985	4,6	416226	366

OWNERSHIP STRUCTURE[1]

- Confederation 1 %
- Others 1 %
- Cantons 5 %
- Corporations and co-operatives 8 %
- Privately-owned forest 27 %
- Political municipalities 28 %
- Public municipalities 30 %



Public forest:
3300 public forest enterprises.
Average forest area per enterprise: 270 ha

Private forest:
Over 240000 owners. Average forest area per owner: 1.3 ha

DISTRIBUTION OF TREE SPECIES[2]

	Number of stems %	Growing stock %
Spruce (Norway spruce)	40	48
Fir (silver fir)	11	15
Pine	4	3
Larch	4	5
Swiss stone pine	1	1
Other conifers	0.4	0.3
Total conifers (12 species)	60	72
Beech	18	17
Maple	4	2
Ash	4	3
Oak	2	2
Sweet chestnut	3	1
Other broadleafs	9	3
Total broadleafs (over 40 spec.)	40	28

FOREST MAINTENANCE

Maintaining the forest means:

- promoting the growth of a healthy, stable and natural forest
- preserving the properties of the forest that enable it to provide protection against natural hazards, i.e. irregular structure and robust undergrowth
- managing the forest's natural life cycles in a targeted way with regard to age composition, structure, diversity of species and wood quality
- felling trees to promote the growth of the healthiest and strongest trees and to create space and light for young trees

Maintaining the forest means not:

clearing the forest and removing fallen branches from the forest floor. Overemphasis on order in the forest is harmful to species diversity. Old or dead trees and fallen branches are part of the forest's biological cycle and provide vital habitats and nutrition for birds, insects and fungi. For example, a quarter of beetle species present in forests is dependent on dead or decaying wood.

WELCOME TO THE FOREST

Please remember your manners when you visit the forest!

- Tree felling is dangerous; keep out of closed-off areas.
- Park all motor vehicles in designated parking areas outside the forest or at the entrance to the forest; you are not allowed to drive in the forest.
- Extinguish all fires. Be aware of the danger of forest fires.
- Take your litter home with you.
- Walkers, horse-riders, joggers and mountain bikers should use paths so as to protect forest plants and animals.
- Do not damage flowers, shrubs and trees; do not break off branches.
- You are allowed to pick berries and flowers – in moderation.
- Observe the local cantonal restrictions when collecting mushrooms.
- Use the picnic areas, playgrounds and campfire sites provided.
- Plants and animals are sensitive to disturbance; do not enter areas with young growth, natural forest reserves and quiet zones.

SERVICES PROVIDED BY THE FOREST

Social services

• Natural habitats	The forest is a natural ecosystem and provides habitats for many rare and endangered animals and plants.
• Recreation	People can relax in the forest, play sports and develop a relationship with nature.
• Landscape structure	The mosaic-like distribution of the forest is a typical feature of Switzerland's traditional landscape.
• Oxygen production	Trees absorb enormous volumes of carbon dioxide through their leaves or needles and produce oxygen which is essential for all living beings.
• CO_2 sink	The trees absorb carbon dioxide (CO_2), store the carbon in the wood. Thus they reduce the CO_2 content of the atmosphere and help counteract the greenhouse effect.
• Water filtering and storage	The forest ensures our supply of drinking water.

Protective services

• Avalanches	The trees stabilize the snow cover and prevent the release of avalanches.
• Flooding	The forest floor and vegetation act like a sponge and thus reduce the threat of flooding and flood peaks.
• Rockfall	The trees block the path of falling rocks.
• Soil erosion	The tree and plant root systems stabilize the soil.

Productive services

• Timber	Timber is one of the few native raw materials and energy sources. It is renewable and can replace non-renewable raw materials and materials with limited renewability (gravel, sand, lime, plastic, oil, coal, gas, etc.).
• Contribution to forest maintenance	The optimum conservation of forest services, such as protection against natural hazards, ecological diversity and leisure functions, necessitates specialized forest maintenance. The use of the timber produced as a by-product of forest maintenance contributes to its cost.
• Employment	Timber use and processing employs almost 70000 people, many of them located in economically peripheral regions.
• CO_2 reduction	Each m^3 of timber that is used in construction instead of concrete, brick or steel or is used to replace fossil fuels saves the environment from the harmful effects of large volumes of carbon dioxide (CO_2).

NATURE CONSERVATION IN THE FOREST

Nature conservation in the forest means:

Conserving all of the plants, fungi and animals that depend on the forest (around 20000 species).

Natural forest management: mixtures of tree species that are best suited to the location; natural rejuvenation to conserve genetic variety; sufficient volumes of old and dead wood; ecologically valuable forest edges.

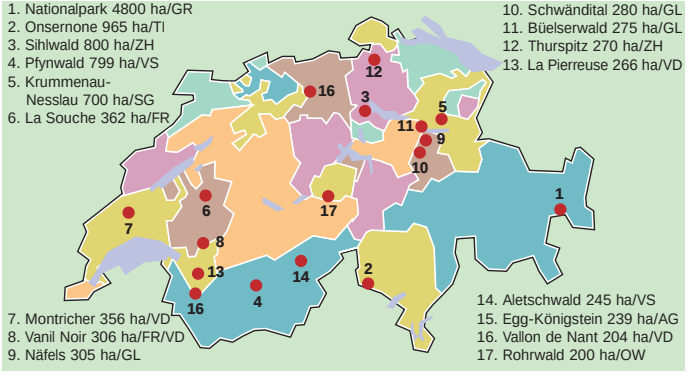
Targeted promotion of less common tree species: in particular the oak in the Central Plateau area.

Avoidance of human intervention in at least 5% of forest area: the forest can develop undisturbed in natural forest reserves and the trees there should be allowed to attain their natural age.

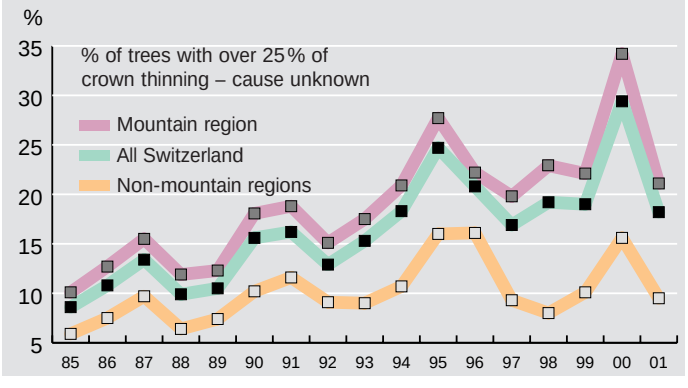
Conserving traditional management forms where they play an important role in maintaining the diversity of habitats and appearance of the landscape: for example, coppices, coppices with standards, wooded pastures and chestnut groves.

Special programmes for highly endangered species: for example, management programmes for the lynx and wood grouse.

SWITZERLAND'S NATURAL FOREST RESERVES (≥ 200 ha)



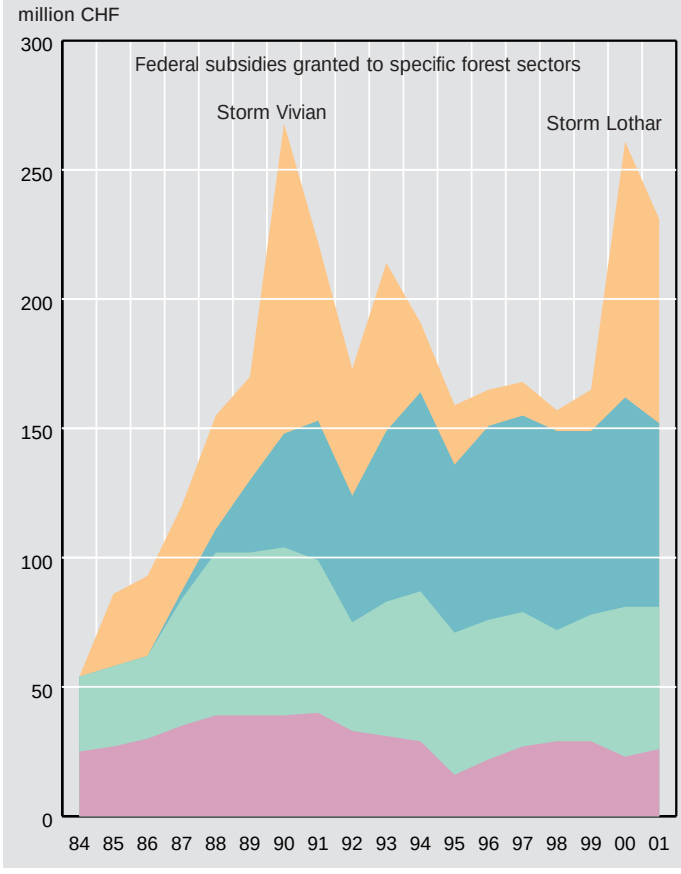
CROWN THINNING[4]



ORGANIZATION OF THE FOREST SERVICE

CONFEDERATION	CANTON
Swiss Department of the Environment, Transport, Energy and Communication (DETEC)	Cantonal department with responsibility for the forest
Swiss Agency for Environment, Forest and Landscape (SAEFL)	Cantonal forest service (cantonal forest office)
Swiss Forest Agency	Forest districts
	Forest ranges

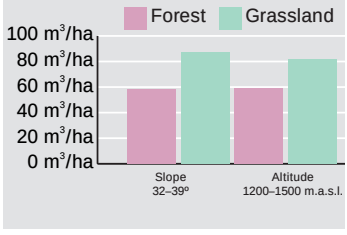
PROMOTION OF FORESTS BY THE GOVERNMENT[1]



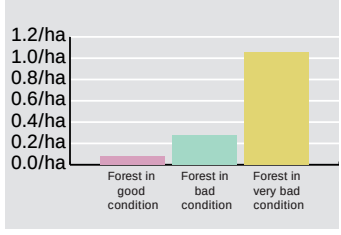
- Management and prevention of forest damage (storm and beetle damage, fire fighting, etc.)
- Silviculture (forest maintenance), forest reserves, forest planning
- Protection against natural events (protective structures and systems, hazard maps, monitoring stations)
- Structural improvements (service roads, joint management, etc.)

Landslides

A well-maintained forest can considerably reduce the risk of landslides being released on slopes. Forests that are well mixed in terms of tree age, height and species provide the best protection. The following graph shows the findings of a study carried out in Sachseln.



Landslide activity (measured in m³/ha) on a comparable slope at a comparable altitude.



Number of landslides per hectare in forested study area.

Debris flows and flooding

The forest curbs peak flows in mountain streams and reduces the threat of flooding and debris flow. It also prevents the erosion of the banks of mountain streams. Trees intercept 15% to 30% of annual precipitation and remove water from the soil. Furthermore, they stabilize the soil to a depth of around two metres and in this way protect against landslides.

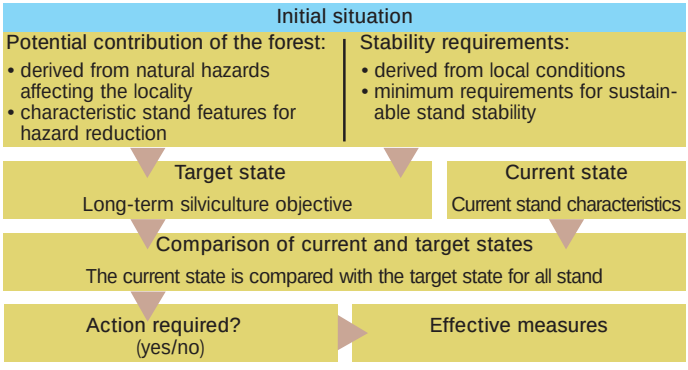
Rockfall

Trees in the forest decelerate and block the path of falling rocks. A dense forest with a graduated structure offers the best protection against rockfall. The forest also prevents rockfall in that its root systems holds the soil, rock and stones together.

Avalanches

A natural evergreen forest with trees of different heights can prevent avalanche release. The tree crowns catch the snow and hold it back until it falls to the ground in clumps. This stabilizes the snow cover, and thanks to the presence of the trees the threat of avalanche release is reduced.

Definition of «minimum maintenance measures»



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FOREST LEGISLATION

Federal Swiss Constitution of 18 April 1991 (SR101)

Art. 77, Forest

1. The Confederation shall ensure that the forest can fulfil its protective, social and productive functions.
2. It defines the principles for the protection of the forest.
3. It promotes measures for the conservation of the forest.

Forest Law of 4 October 1991 (LoF/SR 921.0)

Art. 1, Purpose

[1] This law shall:

a. conserve the forest in terms of its area and spatial distribution;
b. protect the forest as a natural ecosystem;
c. ensure that the forest can fulfil its protective, social and productive functions (forest functions);
d. promote and support the forest sector.

[2] Furthermore, it shall contribute to the protection of people and important material assets against avalanches, landslides, erosion and rock fall (natural events).

Access to the forest

Forests should be accessible to the public, regardless of whether they are publicly or privately owned (cf. also Art.699, paragraph 1 of the Swiss Civil Law Book of 1907, SR 210). Exceptions to this being: areas fenced off to protect young growth; areas with restricted access for conservation purposes, mandatory authorization for major events (Art.14 Forest Law); prohibition of the use of motor vehicles (Art.15 Forest Law).

REFERENCES, INTERNET, IMPRINT

1 Forest and Wood in Switzerland, Yearbook 2002 (Forestry Statistics), Federal Statistical Office/SAEFL, Swiss Forest Agency

2 Second National Forest Inventory (NFI2), Federal Institute for Snow, Forest and Landscape Research

3 Statistical Yearbook for Switzerland 2002, Federal Statistic Office

4 Federal Institute for Snow, Forest and Landscape Research

5 Federal Hunting Statistics 1970–2000, SAEFL

6 Heat grows in the forest, SAEFL and VHe, 1999

7 The state of the world's forests 2001, UN/FAO

8 Census of enterprises 1995, 2000/2001, Federal Statistical Office

9 Senkenleistung und Materialsubstitution beim Schweizer Gebäudepark im Hinblick auf die nationale Treibhausgasbilanz, GEO Partner AG, Zürich, Bericht 2002

10 Swiss greenhouse gas inventory 2000, BUWAL 2002

11 The Swiss Forest – Taking Stock (SAEFL, Swiss Forest Agency 1999)

12 Schlussbericht Projekt «Vegetationswirkungen und Rutschungen» (WSL, 2000)

13 Schweizerische Forststatistik 1870–2000, Bundesamt für Statistik/BUWAL, Eidg. Forstdirektion

Internet Links

p. 2 www.fao.org

p. 3 Land use: www.statistik.admin.ch

p. 5 Distribution of tree species: www.wsl.ch

p. 7 Crown defoliation: www.wsl.ch

p. 13 Wood – a renewable raw material: www.lignum.ch

p. 14 www.holzenergie.ch

p. 17 Forest professions and enterprises: www.statistik.admin.ch

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www.forstdirektion-schweiz.ch

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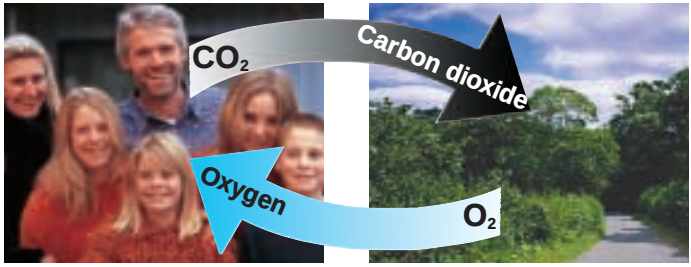
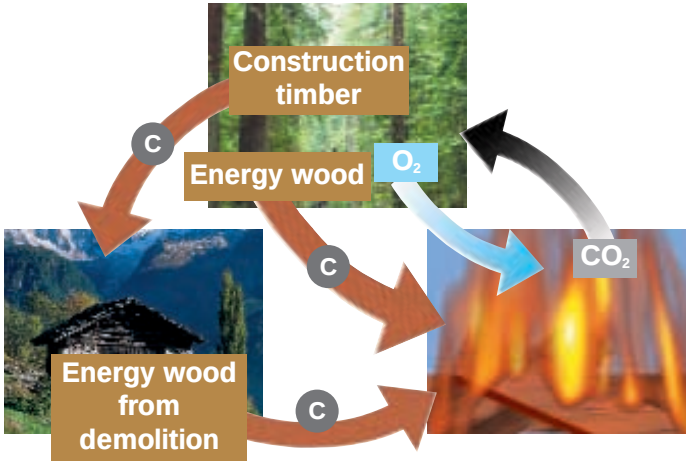
THE FOREST AND WOOD REDUCE CO_2 [9, 10]



The forest as CO_2 sink

The forests absorb carbon dioxide (CO_2), store the carbon (C) in the wood and release oxygen O_2 into the air. The Kyoto Protocol describes this function of forests as «CO_2 sinks». Thanks to the increase in timber reserves and forest area in Switzerland, the forests reduce the CO_2 content of the atmosphere by around 4 million tonnes per year, which corresponds to almost 10% of CO_2 emissions. However, due to the high volume of growing stock in Swiss forests, there is a limit to an additional possible CO_2 storage.

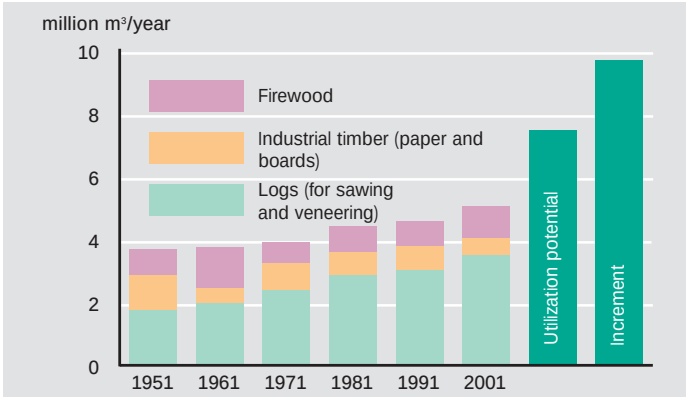


Timber harvest reduces CO_2 emissions

When timber is used as a construction material, the carbon remains chemically bound throughout the lifetime of the building. When timber is used to replace concrete, bricks or steel in construction the atmosphere is also spared the CO_2 that would be released in their production. Around 1 tonne of CO_2 emissions can be saved for each m^3 of timber used to replace these construction materials.

If wood is burned as an energy source, the stored carbon binds with oxygen and escapes as CO_2. With sustainable forest utilization, the released CO_2 is absorbed by the new trees and the cycle is completed. Each m^3 of energy wood that replaces fossil fuels reduces CO_2 emissions by around 0.6 tonnes. It would be possible to increase the consumption of wood for energy by around 5 million m^3 per year without over-exploiting the forest. This would make it possible to reduce Switzerland's CO_2 emissions by 2.5%. This corresponds to around one third of the obligation Switzerland entered into under the Kyoto Protocol.

FOREST UTILIZATION [1,2]



Increment: annual increment in volume of all trees over 12 cm diameter at breast height, including bark and branches.

Utilization potential: annual increment in volume of all trees over 12 cm diameter at breast height, not including bark and branches.

The increment in the Swiss forest makes it possible to increase utilization without endangering sustainability.

WOOD – A RENEWABLE RAW MATERIAL

Some 10 million m³ of wood grows in the Swiss forest each year. Of this, around 7 million m³ can be used commercially. The Swiss forest produces enough timber for the construction of a standard family house (40 to 60 m³ timber) every four minutes.

Good reasons for using more wood

- Wood is one of Switzerland's few raw materials.
- Swiss forests have an excess of wood: almost 10 million m³ of wood grow in Swiss forests every year, and only half of this is harvested.
- The sale of harvested timber helps finance the maintenance of the forests.
- The use of timber in construction reduces the CO_2 content of the atmosphere for centuries to come.

Wood – an outstanding raw material for construction

- Wood can be processed manually or industrially.
- Wood is a light material in relation to its strength. This property facilitates its transport and assembly.
- Despite its low weight, timber has good load-bearing capacity: it can resist fire for longer than concrete or steel.
- Wood is by nature a good insulator. This helps save energy and makes it easy to fulfil strict energy-saving standards.
- Wood has good acoustic properties. It oscillates within the audible frequencies and can deflect or absorb sound waves.
- Wood can be taken apart and put back together again. The resulting materials further optimize the good qualities of the wood. They can be used for special contemporary design structures.
- Timber structures built by craftsmen survive for centuries.

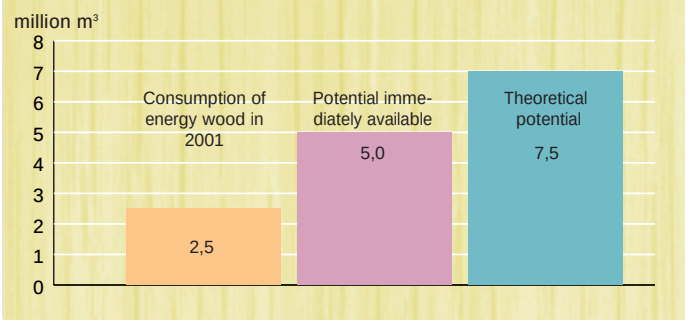
HEAT THAT GROWS ON TREES [6]

Short description of timber energy

- Along with hydro-electric power, wood is Switzerland's most important energy source.
- Wood is CO_2-neutral: in sustainably managed forests, the CO_2 (carbon dioxide) released when wood is burned is re-absorbed by the growing trees (thus, a balance is maintained between growth and combustion).
- Wood energy represents a welcome potential use for low-quality varieties.
- Wood energy creates and maintains jobs in Switzerland. The added value created remains in the region.

The status and potential of wood energy

Wood currently provides for 2.3 % of total energy consumption in Switzerland or around 5% of the country's heating requirements. The sustainably available potential will accommodate at least the doubling of current use levels. Thus, around 10% of Switzerland's heating requirement could be covered without overharvesting the forest and without competing with higher quality wood use.



Energy wood data for 2001

Consumption of energy wood in 2001	2500000	m^3	wood
Substitution of energy wood for heating oil	500000	t	oil
Reduction in burden on the atmosphere	1500000	t	CO_2

Economic advantages of energy wood

Financial flow	Wood	Heating oil	Natural gas
Region	52%	16%	14%
Switzerland	48%	25%	12%
Abroad	0%	59%	74%
Total	100%	100%	100%

100% of the capital invested in wood-burning systems is used within the region and in Switzerland. As opposed to this, 60% to 70% of the capital invested in conventional oil- and gas-fired systems goes abroad. Thus, wood energy makes an important contribution to the preservation and creation of employment, in particular in peripheral regions. Thus, compared with other energy sources, energy wood has important economic advantages to offer.

TIMBER SUPPLY IN SWITZERLAND[1,2]

Overview of Switzerland's timber supply

Timber growth:	10	million m³ (incl. barks and branches)
Residential population:	7	million inhabitants
Utilization potential:	7	million m³ (commercially usable wood)
Timber consumption:	7	million m³ (round timber equivalent)
Timber imports:	7	million m³ (round timber equivalent)
Timber exports:	6	million m³ (round timber equivalent)
Timber utilization in CH:	5	million m³

Domestic utilization of Swiss timber

Timber utilization in CH:	5	million m³
of which domestic utilization:	3	million m³
Exports:	2	million m³

Composition of timber exports

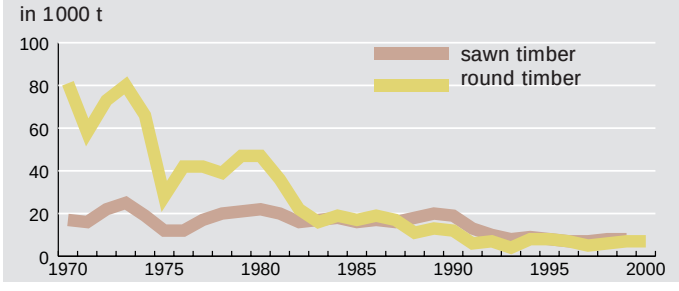
Of the 6 million m³ exported,

2 million m³ is Swiss timber and
4 million m³ is re-exported imported timber

All data: rounded averages for past 12 years.
Round timber equivalent = volume of round timber in m³ required for the production of a certain volume of a timber product (including wood pulp, paper and cardboard).

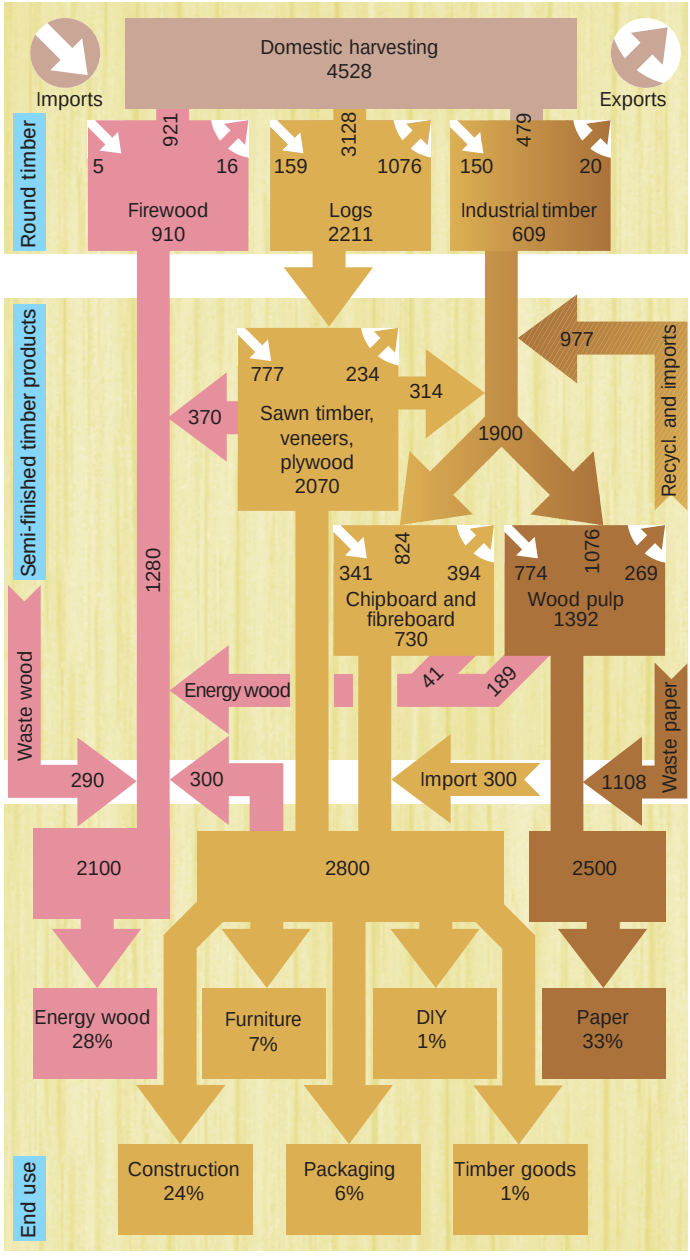
Around 1 m³ of timber is consumed annually in Switzerland per inhabitant. The timber harvested in the Swiss forests corresponds to around 70% of domestic consumption. 60% of this domestic consumption is used at home and 40% is exported. The flow of timber into and out of Switzerland is considerable. The import of timber (7 million m³ round timber equivalent) corresponds to the volume consumed.

IMPORT OF TROPICAL TIMBER[1]



Switzerland's consumption of tropical timber is around 23000 m³ per year. This merely represents 0.3% of the country's total timber consumption of 7 million m³. This figure includes imports from transit countries, such as Germany and France, and the import of veneers and plywood; finished timber products are not, however, included in this figure. For some years now, it has been possible to buy tropical timber with a certificate that guarantees its source as sustainable.

TIMBER FLOW [1] (in 1000 m³ solid timber)

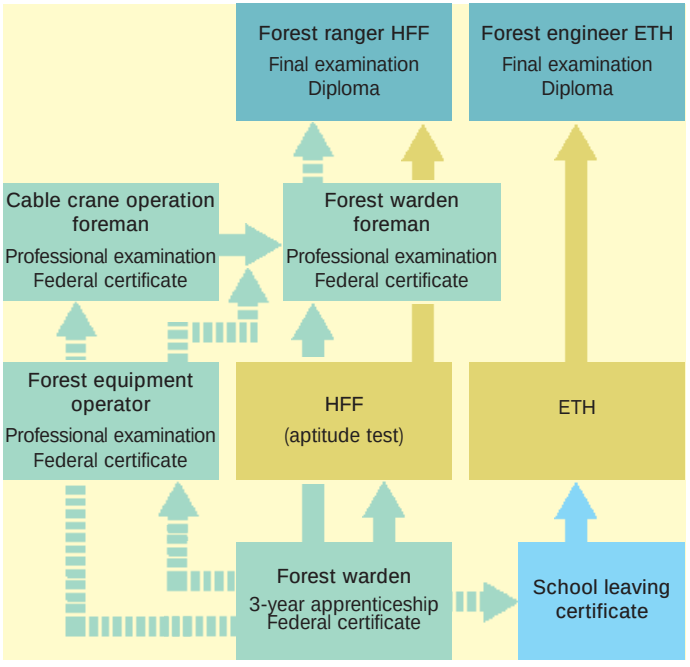


The diagram shows the timber flow from domestic harvesting to consumption (average figures for 1995 to 1999). Annual imports and exports of around 1 million tonnes of paper and cardboard are not included in this timber flow diagram.

PROFESSIONS AND ENTERPRISES[1, 8]

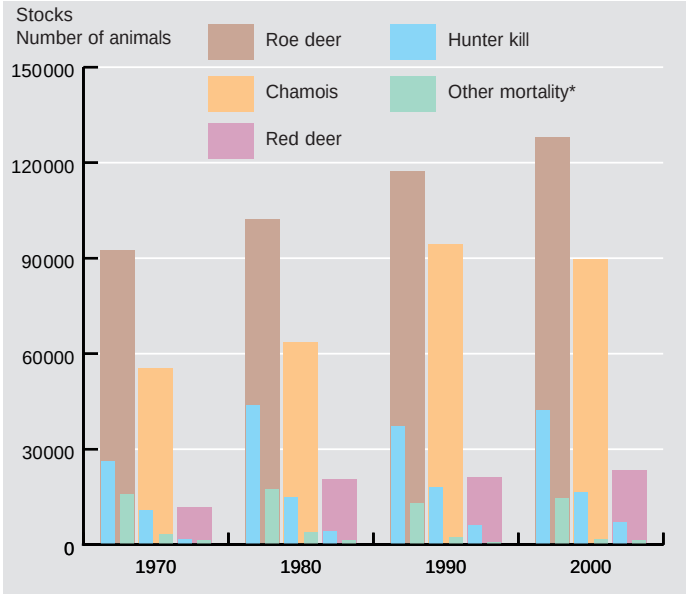
Economic sector	Enterprises 1995	Enterprises 2001	Deviation %	Employees 1995	Employees 2001	Deviation %
Forest sector						
Forest enterprises	1294	1073	-17	6345	5321	-16
Forest contractors	436	497	14	1874	1956	4
Total forest sector	1730	1570	-9	8219	7277	-12
Timber sector						
Sawmills and veneering plants	596	558	-6	3917	3190	-19
Planing and impregnating mills	106	74	-30	1028	632	-39
Board factories	28	24	-14	1244	1345	8
Window and door manufacture	458	418	-9	4912	5800	18
Construction joinery	495	227	-54	3160	957	-70
Interior design	1661	743	-55	9847	4825	-51
Manufacture of joinery goods	3164	4065	29	15383	17587	14
Manufacture of building compon.	129	227	76	2409	2338	-3
Timber packaging and palettes	77	79	3	833	930	12
Other timber goods	208	182	13	927	867	-7
Manufacture of wood pulp	3	4	33	511	495	-3
Paper, cardboard and pulp	50	28	-44	4728	2328	-51
Manufacture of furniture	1219	436	-64	15370	4785	-69
Carpentry and civil engineering	1665	2016	21	14643	15487	6
Roofing	837	732	-13	4976	3953	-22
Timber industry total	10696	9813	-8	83888	65519	-22
Overall total	12426	11383	-8	92107	72796	-21

PROFESSIONS IN THE FOREST SECTOR



WILDLIFE AND HUNTING[5]

Roe deer, chamois and red deer in Switzerland



* Causes of death: road traffic, agricultural machinery, old age, disease, weakness, etc.

European hare

Although the hare is still found throughout Switzerland, stock counts are currently very low. Even in areas with previously high hare populations in excess of 20 hares per km^2, stock counts have now fallen to less than 5 per km^2. If habitats are improved through agricultural compensation areas, under favourable conditions, the hare could once again reach higher densities. SAEFL and FOAG have commissioned a project for the monitoring of hare stocks.

Hunting

Licensed hunting: people fulfilling certain requirements may obtain an annual hunting license valid for an entire canton or parts of it.
Cantons with hunting licenses: AI, AR, BE, FR, GL, GR, JU, NE, NE, OW, SZ, TI, UR, VD, VS, ZG.

District hunting: one or more hunters may lease an area for several years in which only the lease holders and their guests are permitted to hunt. Cantons with district hunting: AG, BL, BS, LU, SG, SH, SO, TG, ZH.

Cantons with a ban on hunting: GE.

Federal areas where hunting is banned: 41. Total area: 1494 km^2.

Hunting should also contribute to forest conservation by regulating the number of wild animals and limiting the damage they cause to the forest.