

02

Territory and Environment

002-0904

Land use in Switzerland Results of the Swiss land use statistics



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Land use in Switzerland

Results of the Swiss land use statistics

Editors Geoinformation Section

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Foreword

Urban agglomerations are growing, glaciers are melting, forest areas are advancing and agricultural areas are decreasing in size. Switzerland's landscape is changing, though at a different pace and scale depending on location. Where is change taking place? How fast is it occurring and how pronounced is it? Which types of land are increasing in size and which are shrinking?

The latest findings from the land use statistics, a systematic analysis of land use in Switzerland, outline the changes that have taken place over a 24-year period from 1985 to 2009. This survey is therefore an essential tool for long-term spatial monitoring. Moreover, it can be used to assess the

extent to which trends prevailing in land use in Switzerland concur with spatial development objectives and targets for the economical use of land resources. This brochure highlights the dominant trends in the land use of Switzerland.



Overview

The landscape in Switzerland is changing. 15% of the country's surface area is not used in the same way as it was in 1985. On the Central Plain, settlement and urban areas have grown at the expense of agricultural areas. In Alpine regions, most noticeable has been the expansion of forest and wooded areas.

Switzerland's surface area offers a patchwork of different types of uses. The land use statistics condense these into four broad designations: settlement and urban areas, agricultural areas, wooded areas (forest and woods) and unproductive areas (lakes and rivers, unproductive vegetation, rocks and screes, glaciers and perpetual snow). Settlement and urban areas, accounting for 7.5% of the surface area, represent the smallest designation, and agricultural areas, with a share of 35.9%, the largest (Graph 1). Wooded and unproductive areas occupy 31.3% and 25.3% of the land area respectively.

The proportion of land occupied by the four main categories varies by bio-geographical region. In percentage terms, settlement and urban areas in the Central Plain region represent more than twice the national average, but such space is much scarcer in Alpine regions. Agricultural areas are above the national average in the Central Plain region (49.5%) and in the Jura (43.4%) but well below that average in the Western Central Alps (18.4%) and the South Flank of the Alps (12.7%). The proportion of wooded areas is above the average in the Jura and the South Flank of the Alps (Ticino). In the central Alpine regions (Valais and Graubünden), the percentage is far lower than the national average. In contrast, this is where the highest proportion of unproductive land is located (49.4%). The Central Plain region consists of 10% unproductive areas (most of which is lakes), while in the Jura the proportion is minimal.

Change in land use has slowed marginally since 1997

Between 1985 and 2009, the total settlement and urban area expanded by 23.4%, with its proportion of the total surface area in Switzerland rising from 6.0% to 7.5% (Graph 2). Likewise a 3.1% increase in wooded areas occurred. In contrast, the total area of land devoted to agricultural uses shrank by 5.4%. A minor reduction of 1.1% in the total unproductive areas was also recorded.

The expansion of settlement and urban areas (Central Plain, Alpine valleys, Jura and North Flank of the Alps) took place almost exclusively to the detriment of agricultural areas at low and intermediate altitudes. Similarly, the increase in wooded areas came predominantly at the expense of agricultural areas. This change chiefly occurred at high altitudes. A noticeable portion of expansion by wooded areas was also at the expense of unproductive areas.

The 2009 land use statistics survey followed previous surveys of 1985 and 1997 as the third in a series of assessments (for more information, please refer to page 23 of this publication). Most often, the new findings confirm trends that had been detected in 1997, although it should be said that the pace of change has slowed down. This applies in particular to settlement and urban areas, which between 1985 and 1997 grew by 13.0% but by only 9.2%

between 1997 and 2009. Regarding agricultural areas, the rate of decline slowed from 3.3% to 2.2%. Wooded areas expanded by 2.2% between 1985 and 1997 compared to 0.9% between 1997 and 2009.

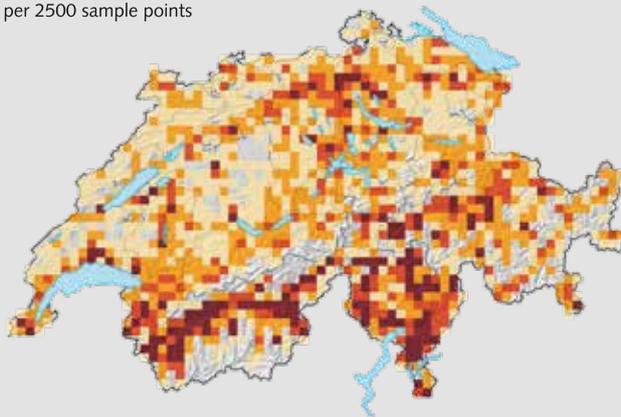
Most significant change in South Flank of the Alps

Change in land use between 1985 and 2009 affected no less than 15% of Switzerland's surface area. Particularly affected were the South Flank of the Alps (Ticino and Valais) along with the Geneva-Lausanne and Zurich metropolitan areas (Map 1). Large contiguous areas that did not undergo variation were only located in high Alpine regions (Bernese, Valais and Graubünden Alps).

Change in land use, 1985–2009

M 1

per 2500 sample points



Number of changes between the four main categories 1985-2009

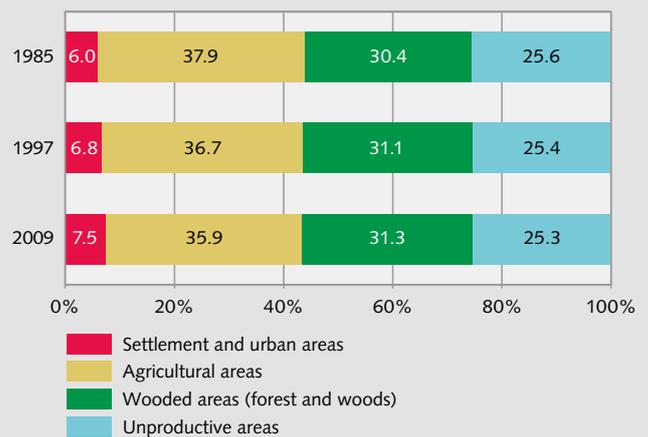


Source: FSO – Land use statistics

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Main land use categories 1985, 1997 and 2009

G 1



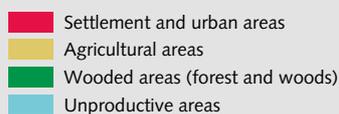
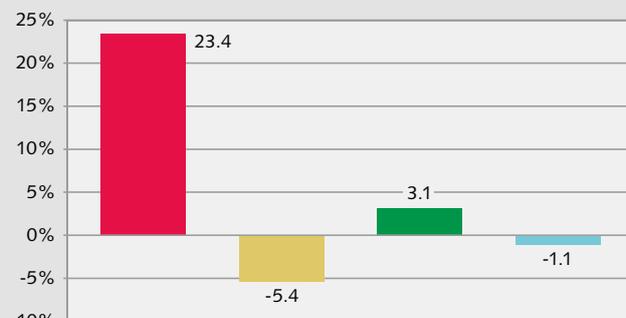
Total area: 4,128,498 ha

Source: FSO – Land use statistics

© FSO

Main land use categories 1985–2009

G 2

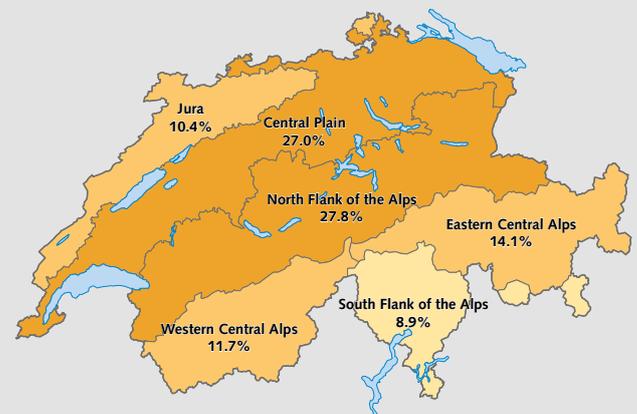


Source: FSO – Land use statistics

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Biogeographical regions of Switzerland

M 2



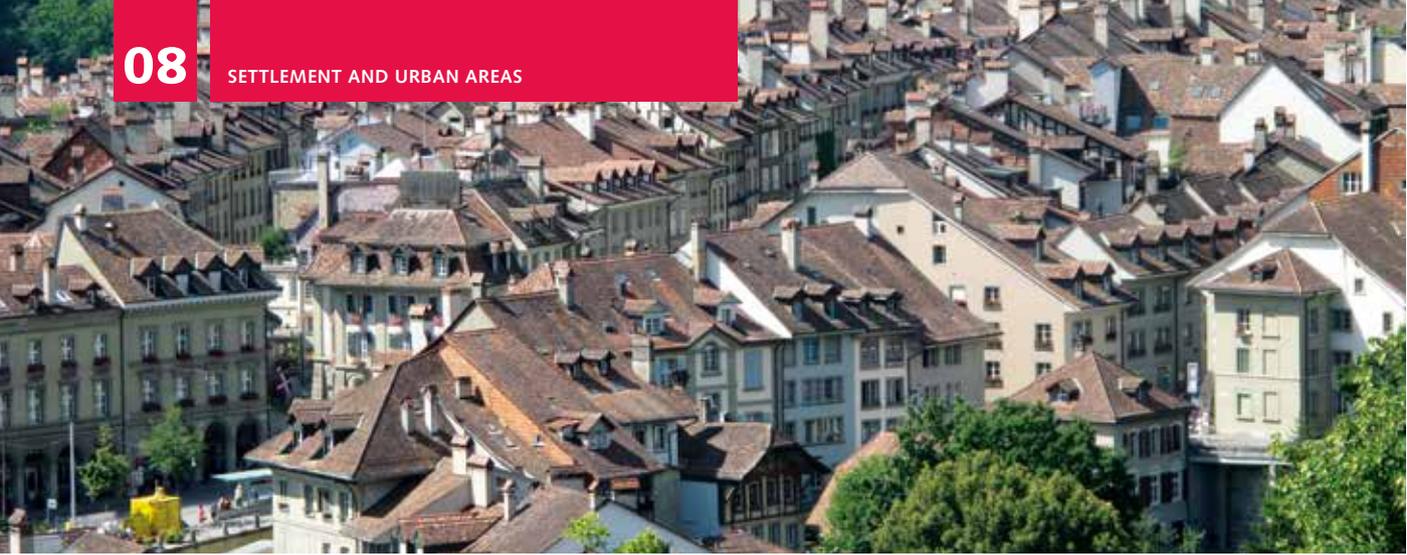
Share of Switzerland's surface area, in %



Source: FOEN

© FSO, ThemaKart, Neuchâtel 2013

CH: 100



Settlement and urban areas: more areas for housing, work, transportation and leisure

Between 1985 and 2009, settlement and urban space grew by almost one-quarter, outpacing the increase in population. Most of the development occurred in agglomeration belts.

Along with buildings, settlement and urban areas encompass all other types of installations relating to housing, work, leisure and mobility. Included in this designation are also green spaces used for recreation. The land use statistics divide settlement and urban areas into five categories: industrial and commercial areas (manufacturing and trade), building areas (housing, public buildings, mixed-use neighbourhoods, agricultural buildings including outdoor areas, and gardens), transportation areas (roadways, railway installations, airports and airfields), special urban areas (infrastructure such as power stations and waste-water treatment plants, dumps, temporary installations such as construction sites and gravel pits) and recreational areas

and cemeteries (parks, cemeteries, playgrounds and sports facilities, garden allotments). Building areas together with industrial and commercial areas account for nearly 60% of settlement and urban space. Just under one-third has been allotted to transportation (Graph 4).

Settlement and urban areas cover 7.5% of the surface area of Switzerland. In the Central Plain region, the proportion is 16.0%, which is more than twice the national average. In Alpine regions, the figure is significantly less (Map 4).



Expansion of transport infrastructure, construction of industrial enterprises and retail outlets on agricultural land (Conthey VS, 1980/1992/2004)

Largest variation in agglomeration belts

Between 1985 and 2009, total settlement and urban space increased by 23.4%, with the rate of growth slowing down from 13.0% between 1985 and 1997 to 9.2% between 1997 and 2009. The highest growth took place in agglomeration belts as well as metropolitan areas consisting of several cities, e.g. between Geneva and Lausanne, and between Olten and Zurich. In addition, rural areas in the Central Plain region, valley plains in Alpine regions and some zones in the Jura and the North Flank of the Alps were affected by the same type of growth (Map 3). In the Western Central Alps (Valais), growth between 1985 and 2009 reached 35.3% and was therefore considerably higher than the national average.

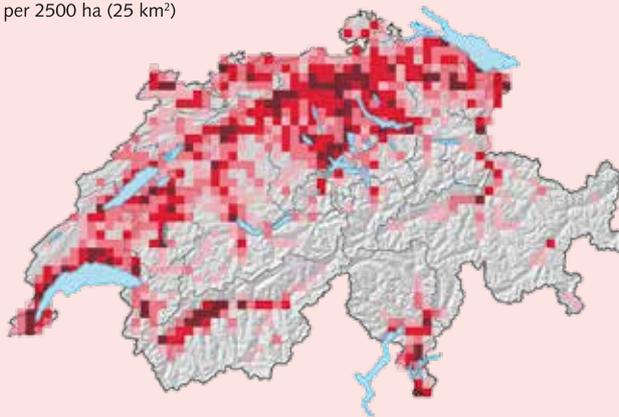
In the period under review, building areas along with industrial and commercial areas each grew by slightly above 30%, whereas transportation areas grew at only half that rate (by just over 15%) (Graph 3). The strongest growth was recorded for recreational areas and cemeteries (37.5%). In contrast, special urban areas shrank by a total of 13.2%, relating chiefly to the lower number of construction sites and the natural rehabilitation of gravel pits.

New construction mainly on cultivated land

Almost all new settlement and urban space (just under 90%) was reconverted from agricultural areas. Only 10% had previously been wooded (forests and woods) or

Settlement and urban areas, 1985–2009 M 3

per 2500 ha (25 km²)

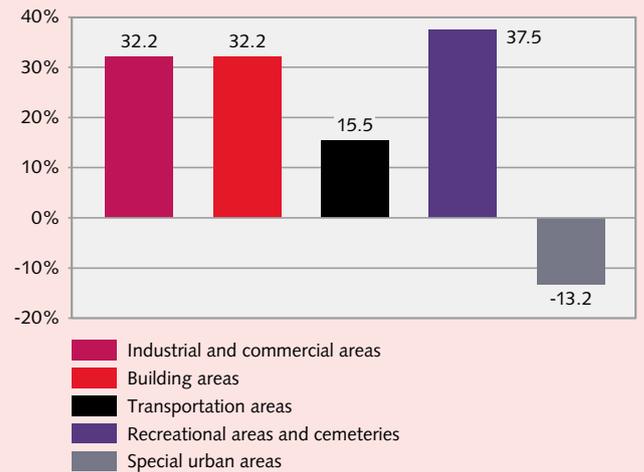


Change of settlement and urban areas 1985–2009, in hectares

-14 – 20	21 – 40	41 – 70	71 – 120	121 – 259
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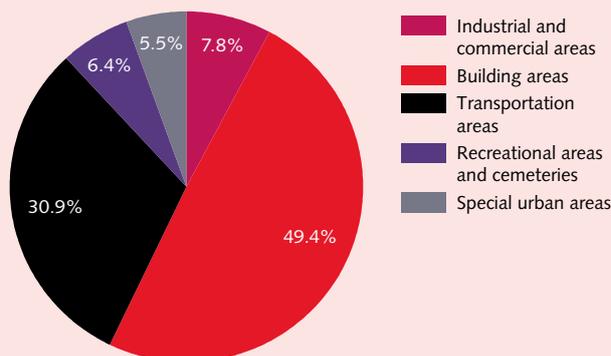
Source: FSO – Land use statistics © FSO, Geoinformation, Neuchâtel 2013

Change in settlement and urban areas by category 1985–2009 G 3



Source: FSO – Land use statistics © FSO

Settlement and urban areas by category 2009 G 4

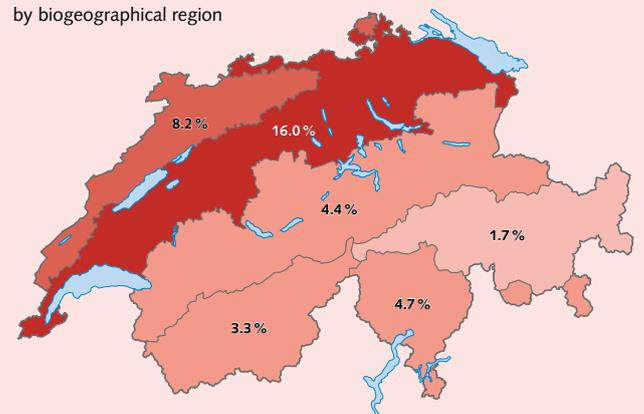


Total settlement and urban areas: 307,897 ha

Source: FSO – Land use statistics © FSO

Settlement and urban areas, 2009 M 4

by biogeographical region



Share of settlement and urban areas of the total surface area, in %



Source: FSO – Land use statistics © FSO, ThemaKart, Neuchâtel 2013

unproductive land (Graph 6). This can be explained by the fact that existing residential areas are for the most part surrounded by agricultural areas. Moreover, farming areas do not enjoy the same degree of legal protection as forests, for which clearing must always be compensated. Most unproductive land is located in remote areas, making it inappropriate for extensions of dwelling space.

Over 400 m² of settlement and urban areas per inhabitant

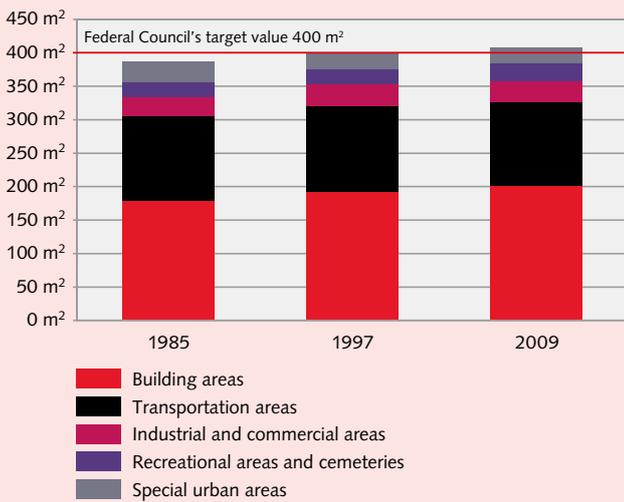
In the 24 years between 1985 and 2009, the residential population of Switzerland rose by 17.5%, from 6.3 million to 7.4 million inhabitants. In the same period, growth in

total settlement and urban areas was a significantly higher 23.4%. Correspondingly, settlement and urban areas per inhabitant increased by approximately 20 m² to 407 m² (Graph 5). The major proportion of the increase concerned building areas. In keeping with the broad trends in settlement and urban areas, growth in the per-inhabitant variable was more marked between 1985 and 1997 than between 1997 and 2009.

The rise in settlement and urban space per inhabitant stemmed from several sources. One was increased personal demand for larger living areas. As such, apartments and single-family houses today have more rooms, and rooms are larger than only a few decades ago. However, higher personal incomes and new forms of cohabitation have also led to increased requirements in terms of living space.

Settlement and urban space per inhabitant 1985, 1997 and 2009

G 5

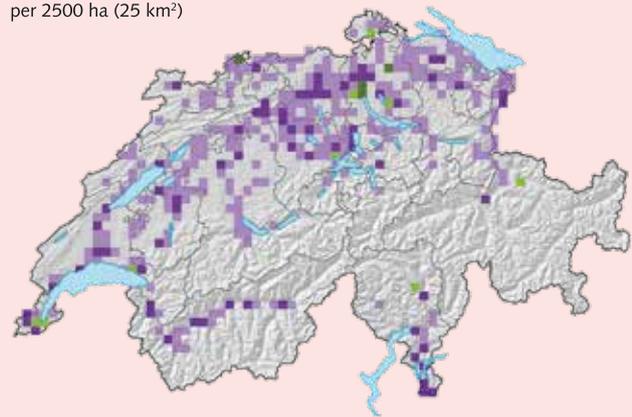


Sources: FSO – Land use statistics; ESPOP (mean annual population) © FSO

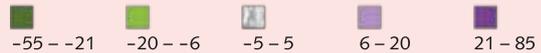
Industrial and commercial areas, 1985–2009

M 5

per 2500 ha (25 km²)



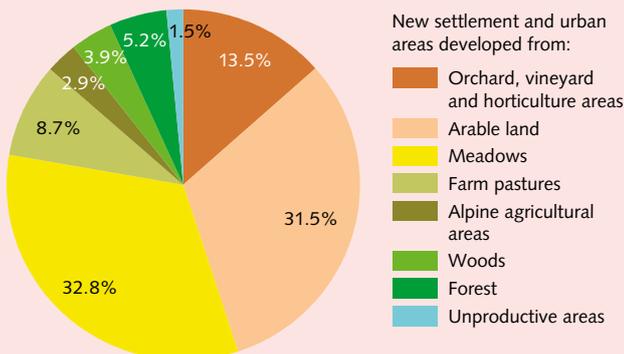
Change of industrial and commercial areas 1985–2009, in hectares



Source: FSO – Land use statistics © FSO, Geoinformation, Neuchâtel 2013

Origin of new settlement and urban areas 1985–2009

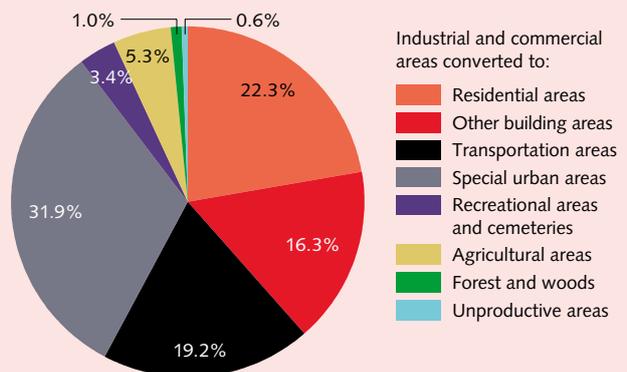
G 6



Total new settlement and urban areas: 65,828 ha
Source: FSO – Land use statistics © FSO

Development of industrial and commercial areas 1985–2009

G 7



Total lost industrial and commercial areas: 2120 ha
Source: FSO – Land use statistics © FSO

Shift by industry and commercial areas to agglomeration belts

Between 1985 and 2009, new industrial and commercial areas were chiefly created in agglomeration belts near motorway intersections (A1/A3 Baden/Brugg, A1/A2 Oensingen/Härkingen/Rothrist, A2 in southern Ticino; Map 5). In particular, haulage and logistics firms, which require a considerable amount of space for warehousing and vehicle storage, primarily established themselves in proximity to motorway junctions and railway lines.

New residential buildings, conveniently located for public and private transportation (Freienbach – Pfäffikon SZ, 1998/2010)



Contrary to the broad-based increase, in some places the opposite trends could be observed – especially in inner-city areas and urban peripheries, which showed a steady downturn in industrial and commercial areas, most significantly in a handful of cities (Zurich, Basel and Winterthur). This trend is principally attributable to shrinkage in traditional manufacturing sectors (e.g. mechanical engineering and textiles). Of the lost industrial and commercial areas, 22.3% is occupied by housing (Graph 7). No less than one-third has become special urban areas. This

category includes construction and brownfield sites (empty buildings and cleared spaces that have yet to be assigned new functions).

Transportation areas growing more slowly than traffic flows

Roads and motorways account for roughly 90% of total transportation space. Between 1985 and 2009, all types of transport infrastructure gained extra space (Graph 8). The area occupied by motorways grew by around one-third, that of other types of road a full 13% and that of railways just under 3%. This analysis only counts uncovered installations, i.e. tracks inside tunnels are not included.

Whereas the space devoted to roads (motorways and other types of road) grew by 14.7% as a whole between 1985 and 2009, the number of newly registered motor vehicles climbed by 64% and the driving performance (the number of kilometres travelled) of motorised road vehicles by 36%. This indicates that traffic flows have risen more sharply than the space set aside for this purpose.

Surface area occupied by airports and airfields increased by 10.2% in the period under review through the expansion of pre-existing facilities. The shutdown of selected military airfields had hardly any effect on the overall space occupied by airports and airfields, as the corresponding infrastructure at the time of the survey had still not been dismantled or converted for the most part.

Sealed surfaces make up more than half of settlement and urban areas

Recreational areas and cemeteries account for a relatively small proportion (6.4%) of settlement and urban areas. Yet the actual proportion of green space within settlement and urban areas is considerably greater because the outdoor



Transformation of industrial and commercial wasteland into housing estates and office buildings (Zurich ZH, 1982/1994/2007)

areas of buildings as well as green strips along streets are counted as building area and transportation area respectively. The degree of land sealing on settlement and urban areas (i.e. the proportion of impermeable ground, corresponding to buildings, asphalt or concrete surfaces) altogether amounted to slightly more than 60% (Graph 10). Thus, just under 40% of settlement and urban areas is accounted for by green areas such as flowerbeds, lawns, woods and private tree stocks. These areas are diverse and, in some cases, have a high degree of biodiversity.

Almost four times as much space occupied by golf courses

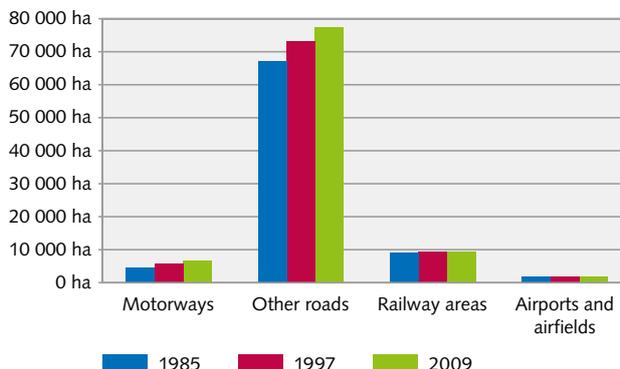
Between 1985 and 2009, the space occupied by recreational areas and parks grew by 37.5%, mainly on account of the increase in public parks and sports facilities (Graph 9). The total area of golf courses grew exceptionally fast at a rate of 280%, with more than four-fifths of this growth accounted for by the 1997–2009 period alone. Growth in other sports facilities is attributable in particular to the increased number of equestrian sports areas, with the surface area of existing facilities furthermore being expanded. The increase in other sports facilities such as football pitches or swimming pools was far more moderate.

Expanded and upgraded road (Riein GR, 2000/2013)



Transportation areas by category 1985, 1997 and 2009

G 8

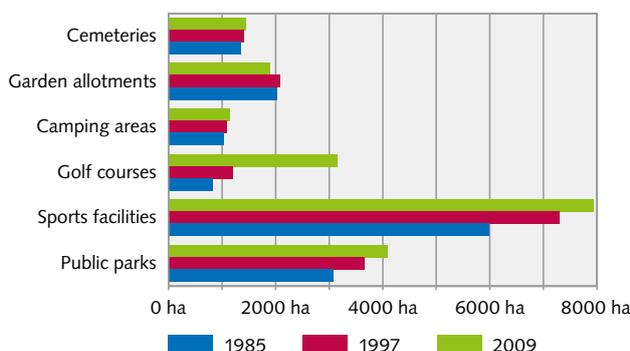


Source: FSO – Land use statistics

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Recreational areas and cemeteries by category 1985, 1997 and 2009

G 9

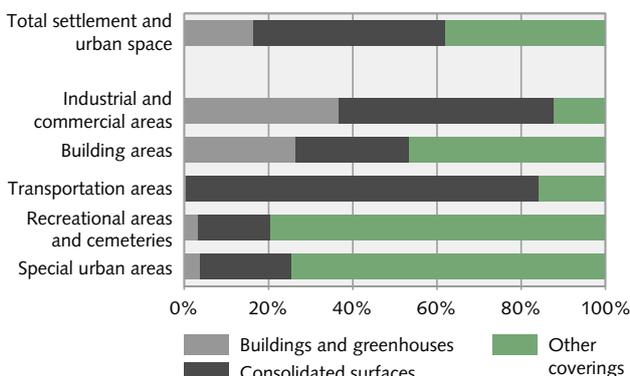


Source: FSO – Land use statistics

© FSO

Degree of land sealing on settlement and urban areas 2009

G 10



Sealed surfaces = Buildings and greenhouses + Consolidated surfaces

Source: FSO – Land use statistics

© FSO



Agricultural areas: encroachment by urban development and forests

More than one square meter of cultivated land is lost in Switzerland every second, taken over by housing or expanding woodlands. On the agricultural land that remains, a trend towards specialisation is discernible.

Agricultural areas encompass productive surfaces relating to crop growing, livestock and fruit cultivation. Likewise included in this designation are greenhouses, but not agricultural buildings such as farmhouses, stables or sheds. With a total surface area of 14,817 km², agricultural zones represent the largest of the four major land use categories (35.9%).

Meadows and farm pastures as well as Alpine agricultural areas each account for no less than one-third of agricultural areas. The proportion of arable land corresponds to 27.5%. Orchard, vineyard and horticulture areas take up only 3.4% of the total agricultural space (Graph 12).

The proportion of agricultural areas in the Central Plain region (49.5%) and the Jura (43.4%) is well above the national average (Map 7). By contrast, a relatively small proportion of land is used for farming in the Western Central Alps (18.4%) and the South Flank of the Alps (12.7%). These regional variations are also reflected in the absolute distribution

of agricultural areas, referred to as the cultivated land stock, two-thirds of which is situated in the Central Plain region and the North Flank of the Alps. The Jura and the Eastern Central Alps each account for no less than 10% of the total (Map 8).

Encroachment on agricultural areas by urban development and woodlands

Between 1985 and 2009, cultivated land receded by an average of 1.1 m² every second in Switzerland. In short, the total agricultural area shrank by 5.4%, as a result of increases in settlement and urban areas and wooded areas (forests and woods). The loss of agricultural areas was more pronounced in the 1985–1997 period (3.3%) compared with 1997–2009 (2.2%).



Expansion of plastic tunnels and greenhouses on arable land (Salmsach TG, 1984/1996/2008)

Overall, 54.5% of lost farmland was reused for settlement and urban development, chiefly among which buildings, industrial and commercial areas (Graph 13). The remaining 45.5% was lost to wooded and unproductive land. New wooded areas primarily occupied abandoned Alpine agricultural areas situated at high altitudes.

Largest decline in cultivated land in the Central Plain region

In the Central Plain region and the Eastern Central Alps, the contraction in agricultural areas between 1985 and 2009 amounted to 5.6% (Map 9), in line with the national

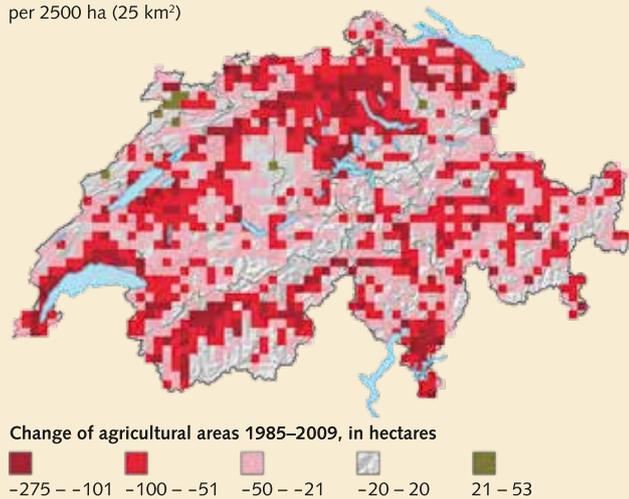
average in terms of percentage change. In the Jura and the North Flank of the Alps, the cultivated area shrank by 3.0% and 3.7% respectively, whereas percentage change in the Western Central Alps and the South Flank of the Alps was far higher than the nationwide average (10.7% and 15.6% respectively). From an absolute standpoint, the Central Plain region showed by far the biggest shrinkage in territory (327 km²). The smallest variation was recorded in the South Flank of the Alps (86 km²) and the Jura (58 km²).

On closer inspection, it can be seen that the largest decrease in agricultural areas took place in urbanised regions, especially the Geneva–Lausanne and Zurich metropolitan areas (Map 6). The process was equally marked

Agricultural areas, 1985–2009

M 6

per 2500 ha (25 km²)

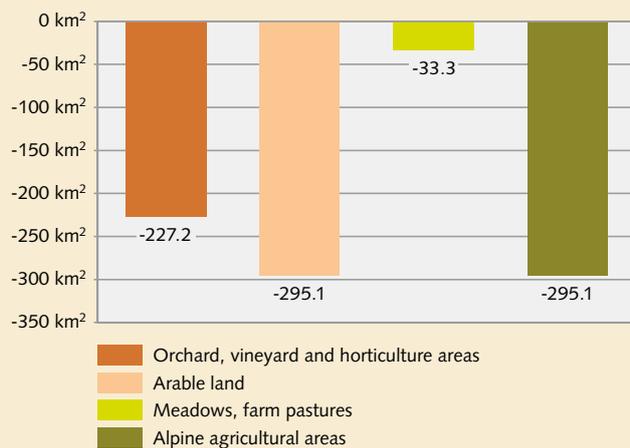


Source: FSO – Land use statistics

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Change in agricultural areas by category 1985–2009

G 11

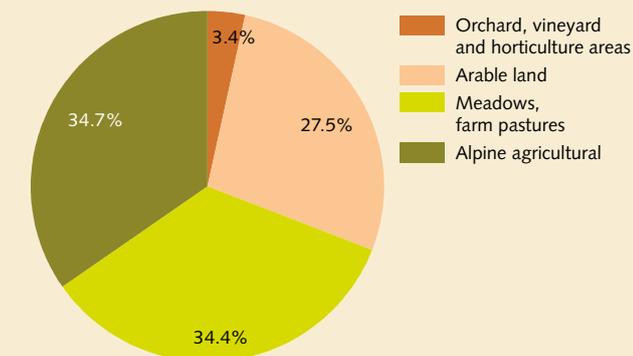


Source: FSO – Land use statistics

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Agricultural areas by category 2009

G 12



Total agricultural areas: 14,817 km²

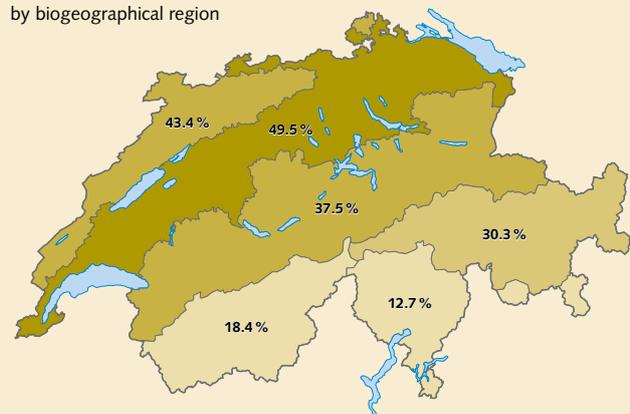
Source: FSO – Land use statistics

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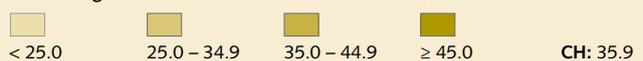
Agricultural areas, 2009

M 7

by biogeographical region



Share of agricultural areas of the total surface area, in %



Source: FSO – Land use statistics

© FSO, ThemaKart, Neuchâtel 2013

in the Rhone Valley (Valais) and urban areas in Ticino canton. A moderate but extensive decrease was also characteristic of the Fribourg/Broye Plain area.

In the Central Plain region, where pressure from urbanisation is at its strongest, as well as the Jura, no less than 90% of lost cultivated land was reused for the purpose of settlement and urban areas. In the North Flank of the Alps and the Western Central Alps (Valais), the decrease in agricultural areas was primarily the result of growth in settlement and urban areas as well. Only in the Eastern Central Alps and the South Flank of the Alps did wooded areas primarily replace agricultural areas.

Increased specialisation and greater number of ecological compensation areas

A breakdown of lost cultivated land by usage type indicates that the largest absolute declines were seen in regard to arable land and Alpine agricultural areas (295 km² each, Graph 11). Lost land in terms of orchard, vineyard and horticultural areas amounted to 227 km². The decrease in meadows and farm pastures amounted to a relatively small 33 km², with new areas to some extent offsetting space lost elsewhere.

One significant reason for the size of differences in lost cultivated land by usage category has been the change taking place in farming practices. In the period between 1985

Cultivated land reserves, 2009

M 8

by biogeographical region



Agricultural area reserves, in km²

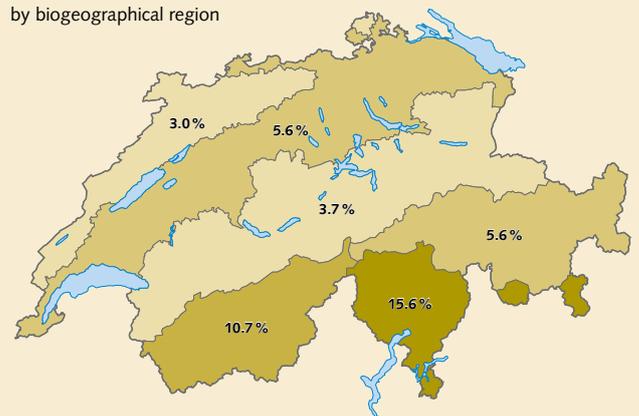


Source: FSO – Land use statistics © FSO, ThemaKart, Neuchâtel 2013 CH: 14 817

Loss of cultivated land, 1985–2009

M 9

by biogeographical region



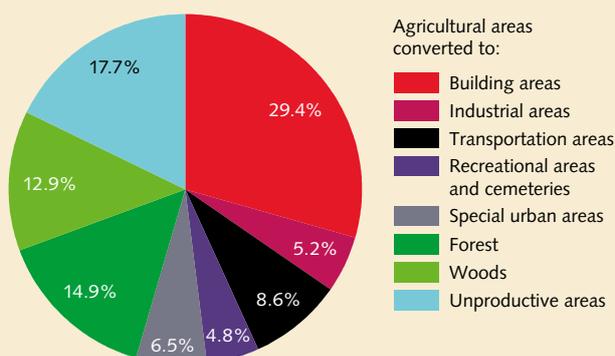
Decrease in agricultural area, in %



Source: FSO – Land use statistics © FSO, ThemaKart, Neuchâtel 2013 CH: 5.4

Development of agricultural areas 1985–2009

G 13



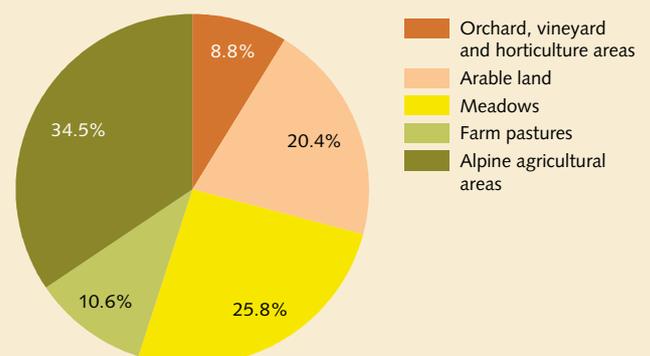
Total lost agricultural areas: 107,933 ha

Source: FSO – Land use statistics

© FSO

Lost agricultural areas by category 1985–2009

G 14



Total lost agricultural areas: 107,933 ha

Source: FSO – Land use statistics

© FSO

Converted arable land
(Hemmental SH,
1986/2010)



and 2009, signs of both more intensive and more extensive land use were observable: mixed cultivations such as field fruit trees were in many places replaced with specialised growing. In addition, other arable land, greenhouses, orchards and vineyards testify to more intensive cultivation. A large number of former arable land have been converted

into meadows and farm pastures, increasing representation of the latter within the breakout of total agricultural areas. This development is based on new extensive cattle rearing. Likewise, there was an increase in ecological compensation areas, which are counted as wooded or unproductive areas as opposed to agricultural areas.

New agricultural areas added in specific locations

Contrary to broad developments, new agricultural areas were created in some localities. One such example is the increased area occupied by wooded pastures in the Jura (known as "Wytweiden"). Many of these pastures have previously been counted as wooded areas, as the woodland itself exceeded a specific density. Around Lake Geneva, the Lower Valais region and southern Ticino, a slight increase in orchard, vineyard and horticultural areas can be identified, resulting from the recultivation of land previously used as gravel or waste disposal sites. In wine-growing regions, some vineyards were extended over previously wooded or unproductive areas.



Wooded areas: more forests at high altitudes

Between 1985 and 2009, the total wooded area grew in size, resulting chiefly from expansion in high-altitude Alpine regions. In these areas, new forests and brushland took the place of abandoned mountain pastures. By contrast, in the Central Plain region and in the Jura, the area covered by forests remained stable.

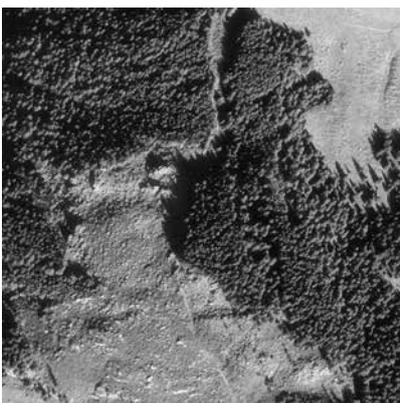
Wooded areas in Switzerland account for 31.3% of the total surface area. The land use statistics draw a distinction between actual forests (dense plantations of young or fully grown trees), brush forest (thick scrubland containing Alpine alders, mountain pine and species of willow) and woodlands (hedges and isolated tree populations). Actual forest land accounts for almost 90% of all wooded areas (Graph 16).

In the Central Plain region as well as in the western and Eastern Central Alps, wooded areas make up less than one-quarter of the total surface area (Map 11). In the North Flank of the Alps, the proportion is well above one-third. In the Jura and the South Flank of the Alps, wooded areas represent in each case almost half of the total surface area. Between 1985 and 2009, wooded area exhibited an

aggregate increase of 3.1%. As with settlement and urban areas as well as agricultural areas, the rate of change between 1985 and 1997 (+2.2%) was faster than in the subsequent period between 1997 and 2009 (+0.9%). The area occupied by actual forests rose by 3.5% between 1985 and 2009. The growth rate for brush forest was 14.7%. In contrast, the size of woods fell by 8.9% (Graph 15).

Expansion of wooded areas driven chiefly by abandonment of mountain pastures

A large proportion of new wooded areas stemmed from the discontinued cultivation of agricultural spaces. Meadows and farm pastures as well as Alpine agricultural areas



Spread of damaged forest area, subsequently overgrown with young trees (Quarten SG, 1984/1996/2008)

that are not regularly cut down or given as grazing land for cattle become invaded by brush and scrub and, later, forests. This was particularly prevalent between 1985 and 2009 in mountain pastures, which because of poor yields stopped being cultivated (Map 10). A further reason for the growth in wooded areas stems from the relatively high average temperature in recent decades, which in turn encourages the emergence of brush forest on previously unproductive land.

Effective protection of forests

Forest protection over the past 150 years has prevented a decrease in wooded areas. To this day, the federal law on forest protection passed in 1876 requires compensation of any for-

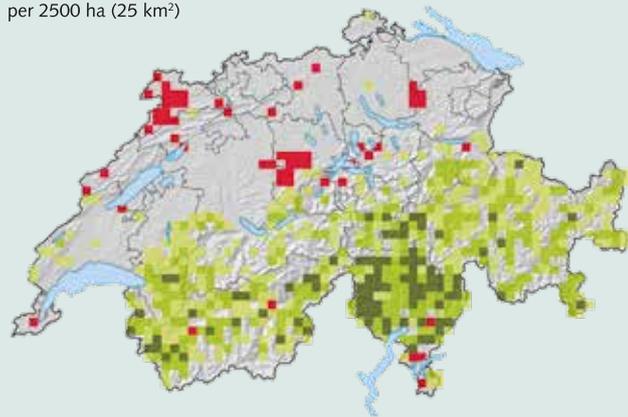
est clearing. The special protective status assigned to forests is justified by the variety of functions they accomplish. Besides timber (for energy production, as a building material and as a basic resources in manufacturing), forests serve inter alia for protecting against avalanches and rockfalls and stabilising soil on steep terrain, as well as improving landscapes and fostering biodiversity (as a habitat to animal and plant life).

Natural hazards, such as the Lothar wind storm in 1999, may decimate whole sections of forest; and it often takes several decades for new trees to grow in the place of those uprooted. Nevertheless, the corresponding surfaces are counted as wooded area because, irrespective of the damage, the land characteristics are still typical of forests and allow for tree repopulation. Thus, land classified as forest area by the land use statistics may temporarily be devoid of trees.

Wooded areas, 1985–2009

M 10

per 2500 ha (25 km²)



Change of wooded areas 1985–2009, in hectares

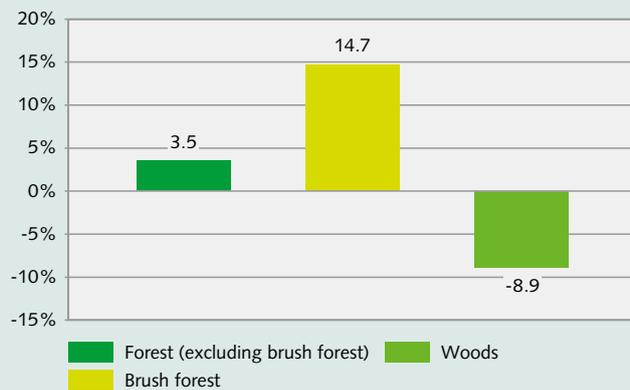


Source: FSO – Land use statistics

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Change in wooded areas by category 1985–2009

G 15

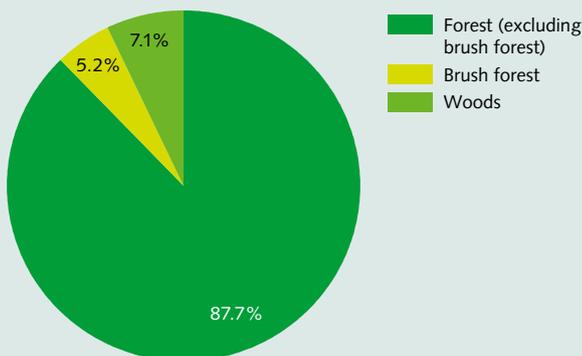


Source: FSO – Land use statistics

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Wooded areas by category 2009

G 16



Total wooded areas: 1,293,062 ha

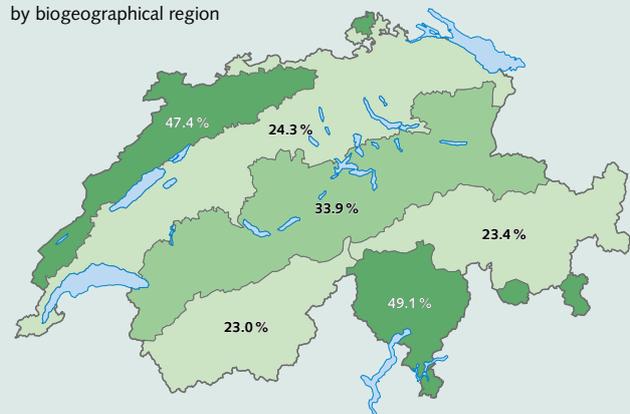
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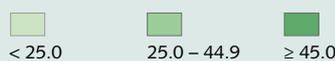
Wooded areas, 2009

M 11

by biogeographical region



Share of wooded areas of the total surface area, in %



Source: FSO – Land use statistics

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CH: 31.3

Forest growth mainly at high altitudes

A total of 97.5% of wooded areas emerging between 1985 and 2009 (462 km²) are located in Alpine regions (Graph 17). The highest rate of growth was observed in the western and Eastern Central Alps, together with the South Flank of the Alps, with each expanding by close to 10%. In the North Flank of the Alps, growth was 3.7%, which was broadly in line with the national average. In the Jura and Central Plain region, however, the increase was 0.3%. In the 1997–2009 period, forest areas in these two regions even shrank by 0.2% and 0.1% respectively.

As a general principle, the higher up, the sharper the relative increase in forest area between 1985 and 2009 (Graph 18). Whereas the growth rate at low altitudes was minimal, between altitudes of 1800 and 2200 meters, it was 23.1%; above 2200 meters, it was as much as 37.9%.

Strong momentum in terms of woods

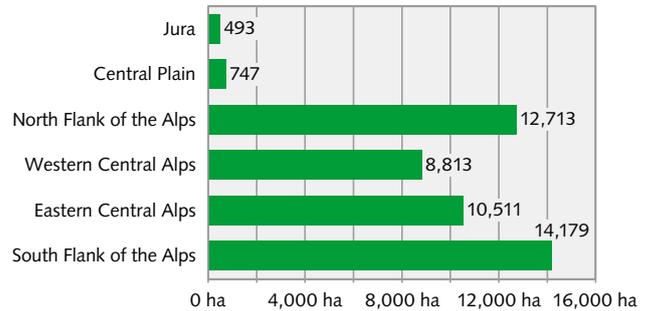
Between 1985 and 2009, total woodland space shrank by 8.9% (Graph 19). In total, 17,519 ha of woodland disappeared, partly offset by a 8,600 ha increase (Graph 19). Most of the lost areas affected low altitudes. Clearing of woods was mainly carried out to forestall encroachment by trees resulting ultimately in a conversion to (legally protected) forest. High altitudes exhibited an increase in woodland, especially on former Alpine agricultural areas and unproductive land.

Forestation on fallow agricultural land (Eisten VS, 1985/2011)



Increase in forest areas by bio-geographical region 1985–2009

G 17

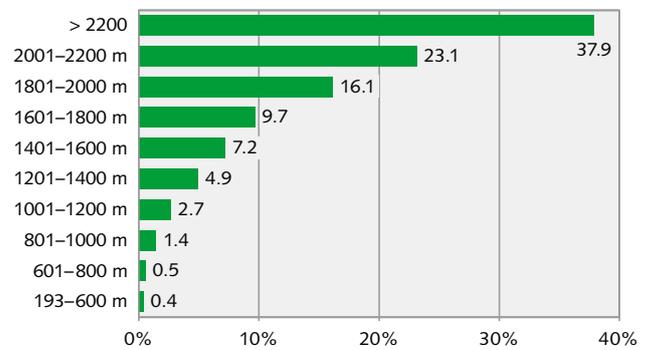


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Increase in forest areas by altitude 1985–2009

G 18

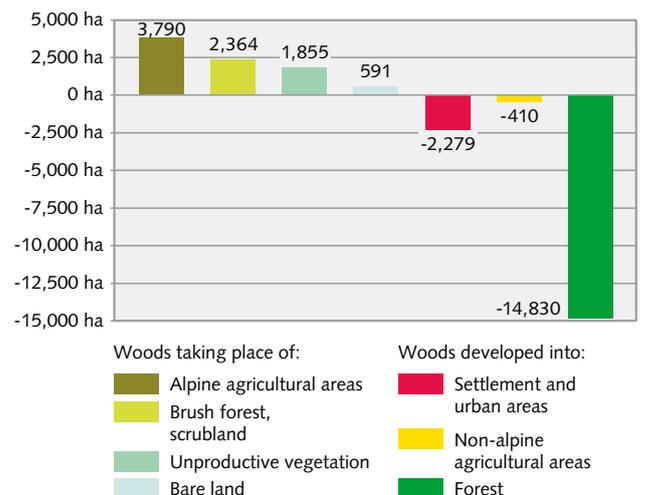


Source: FSO – Land use statistics

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Increase and decrease of woods 1985–2009

G 19



Source: FSO – Land use statistics

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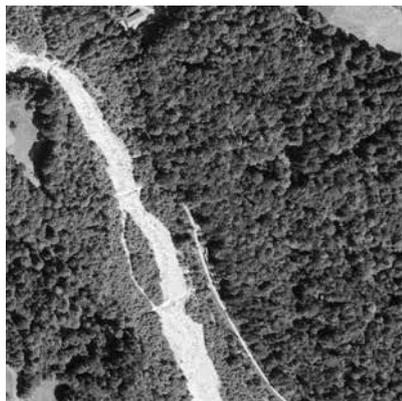
Unproductive areas: recession of glaciers by one-quarter

Unproductive areas are primarily located in Alpine regions. All in all, their surface area decreased slightly between 1985 and 2009, with forest growing in their place. Shrinkage of glaciers gave rise to new bare land. Rivers increased their overall surface area in the Central Plain region.

Slightly over one-quarter of Switzerland's land area is unproductive. The land use statistics divide this main category into five classes (Graph 21). The largest proportion (close to 45%) is bare land (rocks and screes). Unproductive vegetation accounts for close to 28%, while lakes and rivers represent 13.6% and 3.3% respectively. Approximately 11% of the total unproductive area is occupied by glaciers and perpetual snow. The vast majority of unproductive areas are located in the Alps. In the Central Alpine regions, they occupy approximately half the surface area. This proportion for the South Flank of the Alps and the North Flank of the Alps is one-third and one-quarter respectively. By contrast, the proportion of unproductive areas is a mere 10% in the Central Plain region (much of which consists of lakes). In the Jura, the percentage is even lower at 1% (Map 13).

Stable proportion of unproductive areas

The area occupied by unproductive land has not changed substantially in recent years. Nationwide, the corresponding area diminished by 1.1% between 1985 and 2009. The largest decline occurred in the South Flank of the Alps (Ticino) as well as the Western Central Alps (Lower Valais) and the Vaud Alps (Map 12), where former unproductive areas were replaced by wooded areas. Occasionally an increase in unproductive areas was actually observed, most notably in the Eastern Central Alps, in the North Flank of the Alps and in the eastern part of the Central Plain region. The breakdown of increase/decrease in unproductive areas shows that, primarily, glaciers gave up ground (Graph 20), with their total surface area receding by more



Extension of river bed through flooding and construction of a protective dam (Giswil OW, 1980/1993/2006)

than one-quarter between 1985 and 2009. On the whole, area occupied by unproductive vegetation shrunk as well, despite the increase in some places resulting from the abandonment of mountain pastures. The area occupied by rivers, lakes and bare land has increased in recent decades.

Screes in place of glaciers

The area occupied by glaciers contracted by no less than 390 km² between 1985 and 2009. For the most part, melted ice gave way to vegetation-less screes and rocky areas, along with isolated lakes and streams (Graph 23). Bare land corresponds in many cases to a temporary state prior to growth in unproductive vegetation.

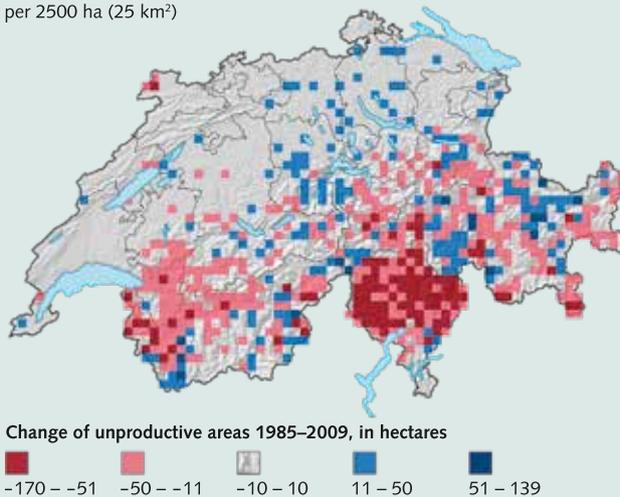
More space occupied by rivers

Unproductive areas increased in the Central Plain region, although this was very localised and occurred primarily in the eastern half. Very often new space corresponded to unproductive vegetation or rivers arising from selective measures to create semi-natural habitats, or as a result of soil and rock displacement due to flooding.

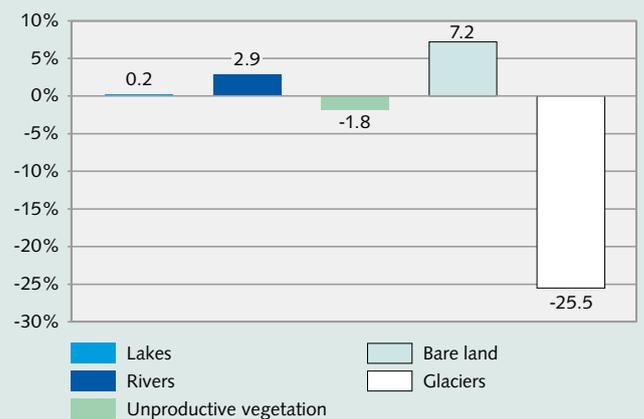
Space claimed by the increased size of rivers was mostly agricultural or forest areas previously (Graph 22). Conversely, woods grew on land that had previously been occupied by rivers. These changes convey some of the dynamic involved with freely flowing waterways: flood waters sweep away river banks together with forests and woods; then the bare land that is left is repopulated by

Unproductive areas, 1985–2009 M 12

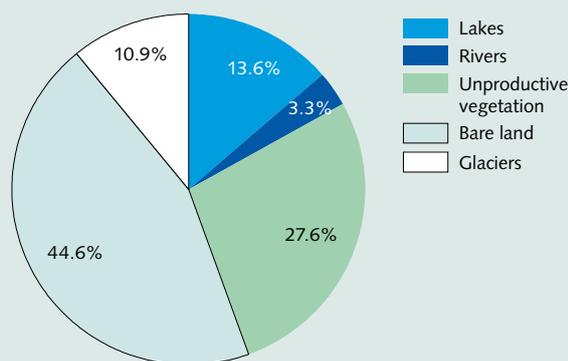
per 2500 ha (25 km²)



Change in unproductive land by category 1985–2009 G 20

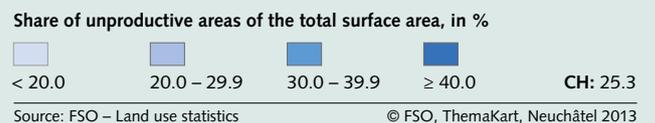
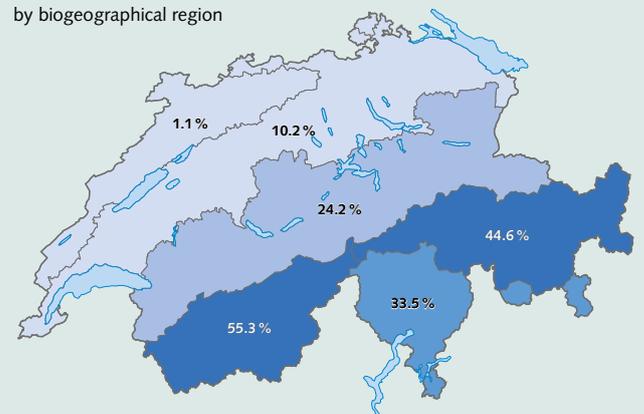


Unproductive areas by category 2009 G 21



Unproductive areas, 2009 M 13

by biogeographical region



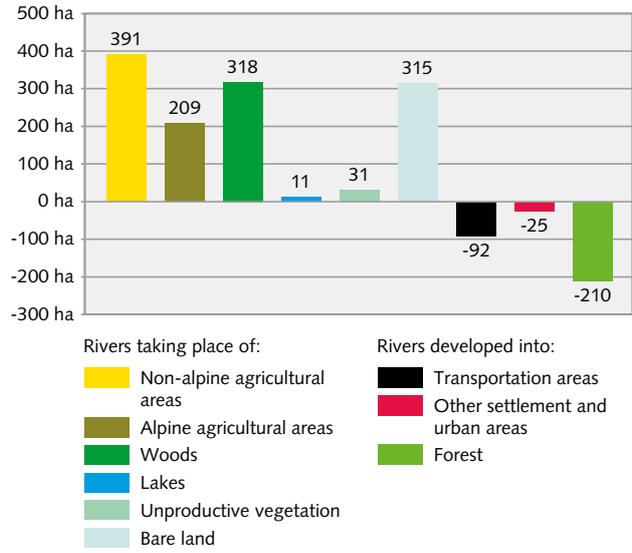
brush and woodland. The decrease in river space in favour of transportation areas resulted from the culvertisation or the rerouting of watercourses for the purposes of infrastructure, and from the covering of watercourses by the construction of bridges and viaducts.

Emergent vegetation following glacial recession (Gadmen BE, 1995/2009)



Increases and decreases in river surface area 1985–2009

G 22

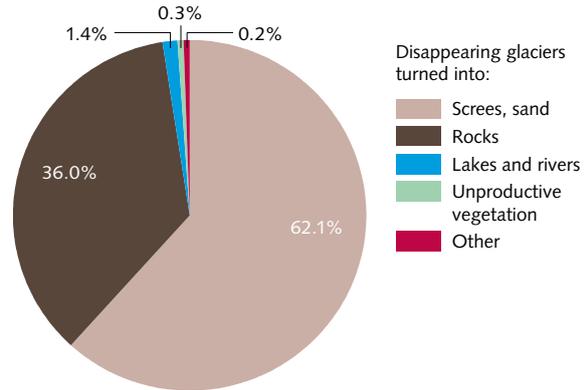


Source: FSO – Land use statistics

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Lost glaciers by category 1985–2009

G 23



Total lost glaciers: 39,184 ha

Source: FSO – Land use statistics

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How does the land use statistics work?

The land use statistics determines the land cover and land use of every hectare of Switzerland by the interpretation of aerial photographs. A total of 72 basic categories have been defined. To date, three standardised surveys have taken place using aerial images from 1979–1985, 1992–1997 and 2004–2009. The periodicity is therefore 12 years. These three periods have simply been referred to as 1985, 1997 and 2009 in this report as well as in the maps and charts. The basic categories have been aggregated into 17 classes and 4 main categories.

Data and information from the land use statistics

Data and information on the methodology of the land use statistics are available online and in periodic publications.

Web: www.landuse-stat.admin.ch

Email: arealstatistik@bfs.admin.ch

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Photographs: © Land use statistics

- Lead photographs:
- p. 5 Foreword: Silvaplana – Surlej (GR)
 - p. 6 Overview: Rhone valley near Ardon, Vétroz and Conthey/peak of Diablerets (VS)
 - p. 8 Settlement and urban areas: Bern old town (BE)
 - p. 13 Agricultural areas: Seewald Gampelen (BE)
 - p. 17 Wooded areas: Uaul da Vergera Disentis (GR)
 - p. 20 Unproductive areas: Baldeggersee Hochdorf (LU)

The Federal Statistical Office's land use statistics provide data on the situation and changes with regard to land use in Switzerland between 1985 and 2009. This publication contains information on the main national results in the categories of settlement, agriculture, wooded and unproductive areas.



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