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IS SWITZERLAND LOSING ITS CAPITAL?

A plea for monitoring landscape qualities

The high concentration of multiple landscapes is considered one of Switzerland's unmistakable hallmarks. Spectacular mountain landscapes in combination with a mosaic of settlements, grasslands, and forests are an important resource for the tourist industry. The State Secretariat for Economic Affairs estimates that the value of the Swiss landscape for tourism alone amounts to approximately 70 billion francs¹. **Adrienne Grêt-Regamey, Sibyl Hanna Brunner, Ulrike Wissen Hayek**

In addition the landscape is an important locational factor for economic development. It is considered one of Switzerland's most important competitive advantages for getting businesses to settle down in the country, and attracts many foreign companies. As a result of rapid technical, economic and social developments, Swiss landscapes have been changing at an accelerating rate². Rural grasslands are increasingly being covered by forest, primarily on particularly low-yielding and laborious to cultivate agricultural land. Many tourist centres have experienced uncontrolled growth since the Alpine tourism boom of the 1950s (Fig. 1a). The peri-urban space is characterized by unrestrained fragmented development as a result of the increased demand for space, which is reflected in the constantly increasing living space per inhabitant (Fig. 1b). The development of the infrastructure necessary for supporting such an expansion drives even more fragmentation of the landscape. Until the late 1960s, urban areas were characterized by a strong population increase (Fig. 1c). This trend however was reversed due to a strong suburbanization a decade later: the urban population began to move away from the city centres to the peri-urban areas. Since the end of the 20th century, population density in many cities has again been increasing. Yet, the ever greater alienation from a region-typical architectural style and the increasing market dominance of national and global companies is leading to an increased monotonization of the urban areas.

These changes are accompanying the debate on the European Landscape Convention, which is waiting for ratification by the Swiss government. The document defines "landscape" as "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors"³. On the one hand, landscape is therefore the product of spatial actions. Its character develops as a result of natural processes interacting with human uses. On the other hand, it is defined by people's perception of the landscape. According to this definition sprawling urban areas, overgrowing mountain meadows, and large shopping centre developments outside settlement areas are all part of our landscape. Such images shake the centuries-old association of the word "landscape" with terms such as "scenic beauty", "ambience" and "harmony", and lead to the question of the potential of these new landscapes for creating new landscape values.

People experience the extent and speed of landscape change differently⁴. Fast, sudden changes in a person's immediate environment, such as the building of new infrastructures on neighbouring open areas or a suddenly burned-down building, are perceived as in-

cisive. Developments within a larger perimeter over longer periods, such as the settlement development of an entire neighbourhood, are usually only perceived subconsciously. If the changes however go beyond a particular threshold, the formerly familiar place is perceived as alien. One typical example is the cumulative effect of multiple architectural changes that together are suddenly seen as negative. Too many different architectural styles within a city centre or a residential area give a sense of randomness and a lack of an overall concept.

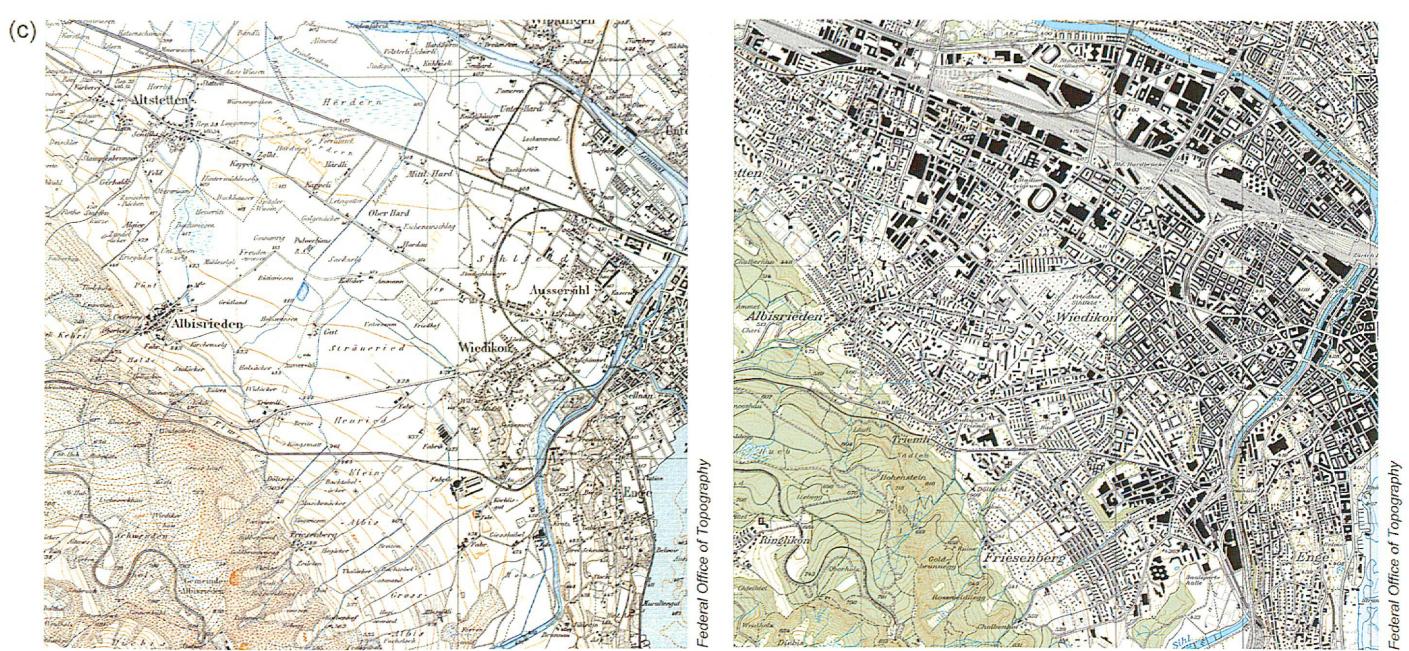
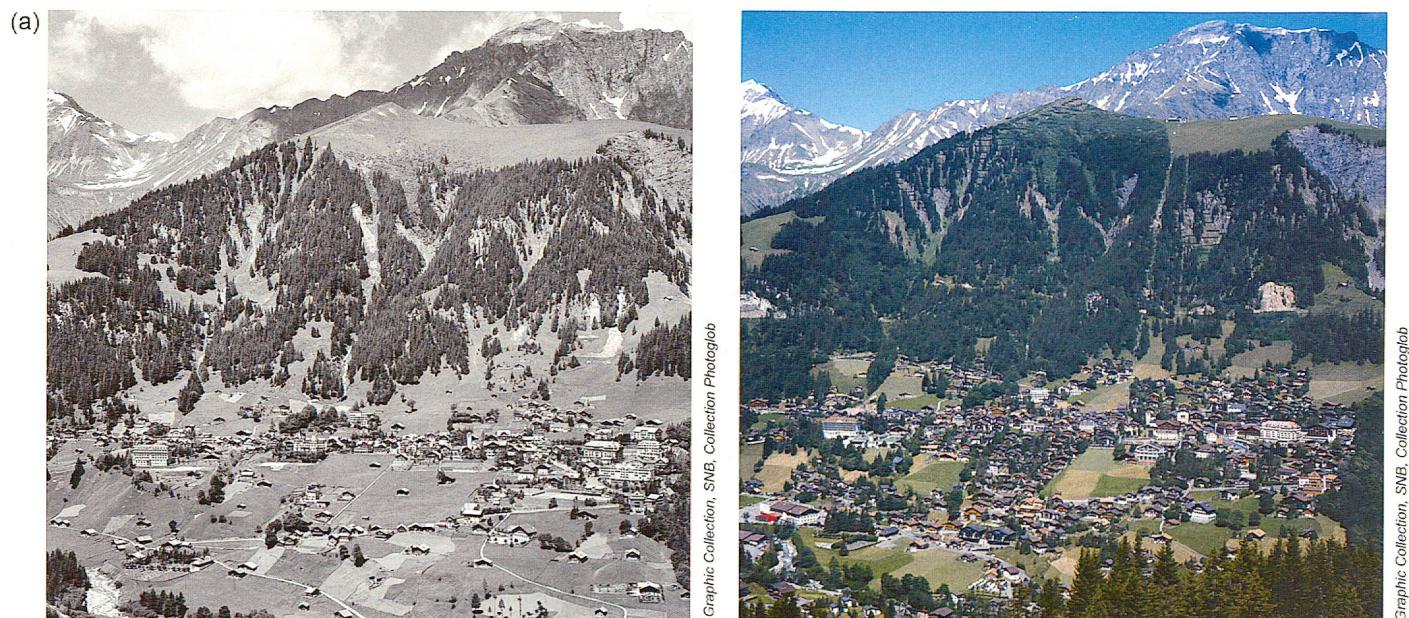
The resulting spatial alienation and lacking potential for identification with the new landscape have additional consequences: people's sense of responsibility for a certain area is decreased, which is reflected in their decision-making and ultimately has significantly detrimental effects on the landscape.

Making Landscape Change Measurable

In order to measure the landscape developments illustrated in Figure 1 in a quantitative manner, the Federal Office for the Environment has launched a national landscape quality-monitoring project, the Swiss Landscape Monitoring Programme (LABES)⁵. Together with experts from cantons and the scientific community, a set of indicators to monitor landscape qualities and region-typical landscape characteristics was designed. The indicators are categorized into the five following thematic areas: (1) quantitative and qualitative soil preservation, (2) diversity of use, (3) space for nature and culture, (4) sense of place, and (5) preservation of the landscape as a responsibility at the national level. Fig. 2 depicts the developments of selected landscape qualities in the cantons of Obwalden (OW, rural), Aargau (AG, peri-urban) and Basel-city (BS, urban).

The rural area is characterized by large forested areas: in the canton of OW 64 percent of the land is covered with forest. The unchanging level of deforestation in all cantons demonstrates the effectiveness of land-use planning. The Forest Policy (Forstpolizeigesetz) that came into effect in 1902 (today's Waldgesetz (Forest Law)) ensured that forests all over the country were protected from

Figure 1 (a) Tourism boom and afforestation in Adelboden between 1945 and 1999, (b) Uncontrolled fragmented development in Oberlunkhofen in the Reuss Valley between 1931 and 2000, (c) Densification of the city of Zurich between 1881 and 2007.



early on. The consequence has been that the level of afforestation increased by more than 40 percent in the 20th century, despite increased pressure on the landscape. This figure has not dropped significantly over the past 30 years. The peri-urban area, however, is characterized by urban sprawl and increased soil-sealing. The building of new roads, houses, shops and offices is largely taking place at the expense of agricultural land, which, in contrast to forests, is not protected. The changes in land use over the past 30 years have been smallest in the urban area. In the canton of BS 52 percent of the area was already built-up in the early 1980s. Despite this high percentage, the value of the weighted urban sprawl in the urban canton shown in Figure 2 is relatively low: the living space per inhabitant is small and the built-up area is used efficiently.

Is Our Landscape Capital Growing or Shrinking?

In order to judge how the observed changes are affecting our landscape capital, the quantitatively determined trends can be compared with the qualitative goals of the Swiss guideline "Land-

scape 2020" (Landschaft 2020)⁷ and the Focal Study Landscape (Fokusstudie Landschaft)⁸. The comparison shows that most of the changes are in conflict with the vision of what the landscape should look like in the future. To put it bluntly, our capital is shrinking. Yet, the comparison of the qualitative goals with the quantitative variables only covers part of the LABES's thematic areas. For many indicators there are still no comprehensive data allowing the creation of time series. The topic "sense of place", which confronts landscape perception and landscape experience, was for example not considered here, as the relevant indicators still require significant research work and are not yet usable. The presented short quantitative analysis therefore leaves many questions unanswered. Would such an evaluation of Swiss landscape capital turn out differently if we were able to take landscape perception into account? Do the qualitative goals change as a result of people's ability to adapt to changes to the landscape? What are the threshold values that lead to a loss of sense of place and to an alienation from a formerly familiar landscape?

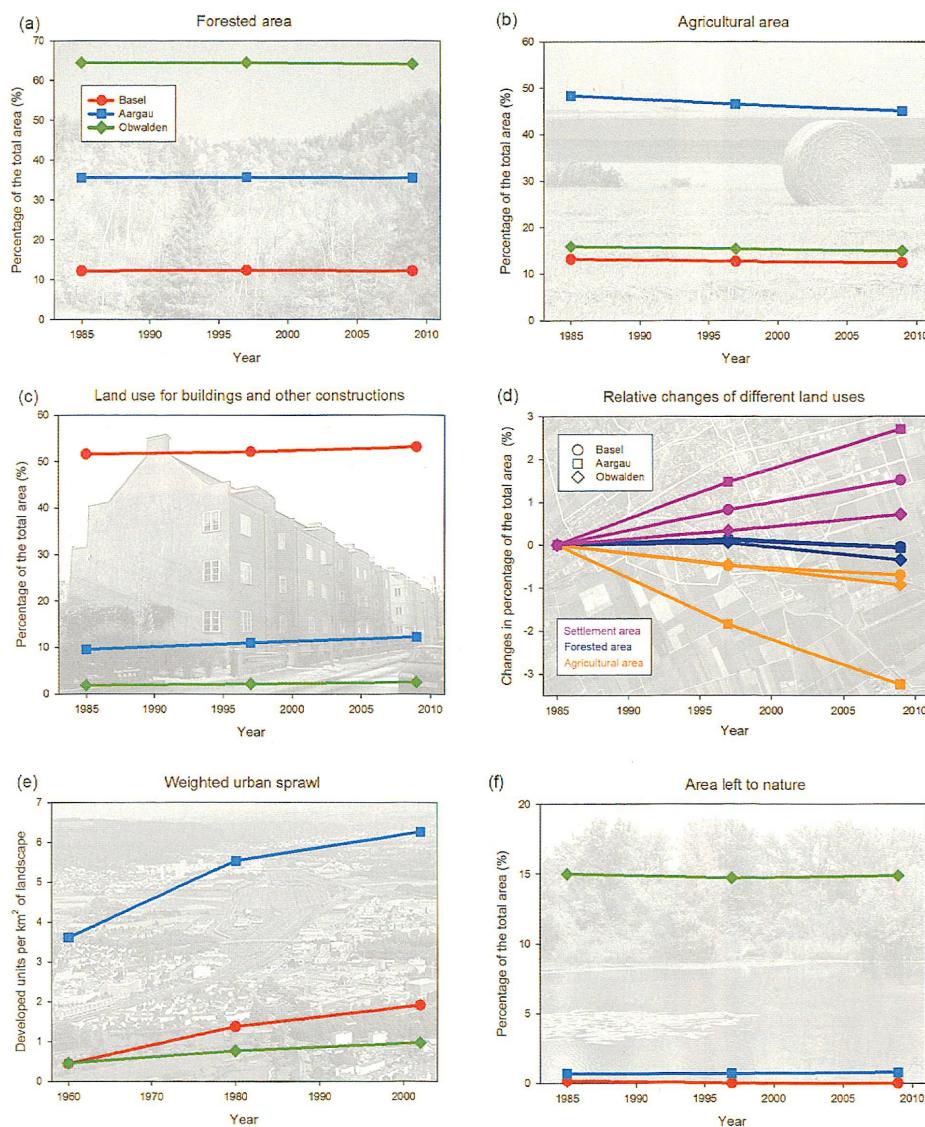


Figure 2. Selected indicators of landscape quality over time⁶: (a) forested area, (b) agricultural area, (c) land use for buildings and other constructions, (d) relative changes of different uses, (e) weighted urban sprawl, (f) area left to nature.

Conscious Landscape Planning to Preserve Our Capital

The value of our landscape is not just defined by its spatial character. It is also defined by the significance people attribute to it. In order to achieve the goal of sustainable landscape development, it is therefore central that landscape planning becomes aware of the different landscape perceptions, so that the associated concerns can be incorporated into the planning and decision-making processes early on. Participation processes actively involve the people in landscape planning, which can strengthen the extent to which people identify with the landscape, while increasing their acceptance for particular measures. Above all, it allows addressing perception-related landscape qualities. This can strengthen decision-makers' awareness of the significance of landscape for people and create a basis for continuous monitoring of these qualities. GIS-based 3D landscape visualizations have proven to be a valuable communication tool. They depict landscape changes in a three-dimensional perspective⁹. Figure 3 shows how operators can use rulers to alter landscape qualities (by changing the

level of afforestation for example) and thereby immediately see the landscape changes. The discussion of the different scenarios allows the participants to develop a common vision of the desired future landscape. The method of backcasting^{10,11} is, then, suitable for deducing suitable land-use measures from these visions. First, the qualities of the current landscape, whose development is central to the vision's implementation, are identified. Next, strategies for controlling and monitoring these system-relevant landscape qualities are designed. Since the measures are based on objectives that are widely supported by the population, the negative outcome of overstepping threshold values can be avoided.

We therefore recommend that our landscape policies should define landscape quality standards and guarantee a monitoring of the landscape qualities in the long-term. It is only through combining landscape development goals with clearly defined qualities that it will be possible to develop effective implementation tools and secure the value of our precious landscape capital for the future.

Ruler

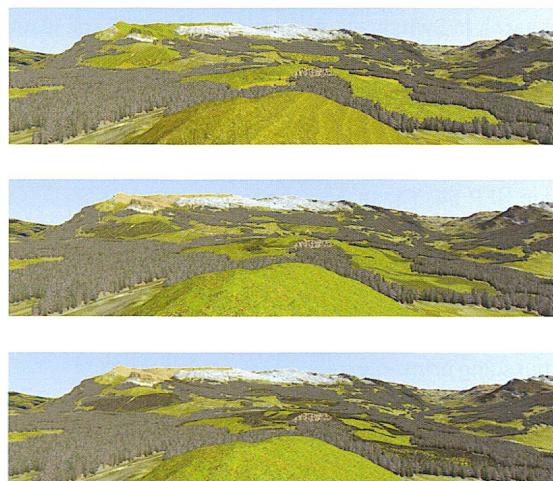
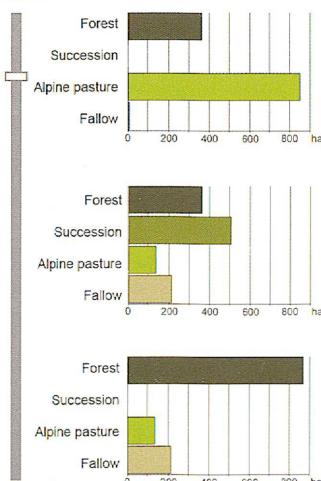


Figure 3. GIS-based 3D-visualizations: interactive changes to landscape qualities using a ruler.

¹ State Secretariat for Economic Affairs SECO (2002): Plausibilisierung Nutzenschätzung Landschaft für den Tourismus. Online: www.seco.admin.ch.

² Federal Office for the Environment FOEN (2003): Landschaft 2020. Analysen und Trends. Schriftenreihe Umwelt, Nr. 352.

³ European Landscape Convention, Article 1. In effect since 1 March 2004, ratified by 29 states, signed by 6 states (incl. Switzerland). Online: www.admin.bafu.ch.

⁴ Felber Rufer, P. (2006): Landschaftsveränderung in der Wahrnehmung und Bewertung der Bevölkerung. Eine qualitative Studie in vier Schweizer Gemeinden. Swiss Federal Institute for Forest, Snow and Landscape Research WSL.

⁵ Swiss Federal Institute for Forest, Snow and Landscape Research WSL (2011): Landschaftsqualität Konzepte, Indikatoren und Datengrundlagen. Forum für Wissen 2010. Online: <http://www.wsl.ch/dienstleistungen/publikationen/pdf/10737.pdf>.

⁶ Basis for the data in Figure 2: (1) Federal Office of Statistics. Arealstatistik. Survey periods 1979–85, 1992–97 and 2004–09. (2) Swiss Federal Institute for Forest, Snow and Landscape Research WSL: Schweizerisches Landesforstinventar LFI. Survey periods 1983–85, 1993–95 and 2004–06. (3) Federal Office for the Environment FOEN. Aueninventar. State of affairs in 1994 and 2007.

⁷ Federal Office for the Environment FOEN (2002): Landschaft 2020. Analysen und Trends. Schriftenreihe Umwelt, Nr. 352.

⁸ Grêt-Regamey, A.; Neuenschwander, N.; Backhaus, N.; Tobias, S. (2010): Fokusstudie Landschaft. Nationales Forschungsprogramm NFP 54.

⁹ Wissen, U. (2009): Virtuelle Landschaften zur partizipativen Planung – Optimierung von 3D Landschaftsvisualisierungen zur Informationsvermittlung. IRL-Bericht 5, ETH Zurich.

¹⁰ Grêt-Regamey, A.; Brunner, S. H. (2011): Methodischer Rahmen für den Einsatz von Backcasting zur Anpassung an den Klimawandel. DisP 1, Zurich.

¹¹ Grêt-Regamey, A.; Crespo, R. (2011): Planning from a future vision: inverse modeling in spatial planning. Environmental and Planning B, in press.