



News

Archive

Adapting to climate change – a

Video

Contact

RSS-Feed

Birmensdorf, 31.10.2016

Adapting to climate change – a major challenge for forests

Climate change means that trees germinating today will be living in a much-altered climate by the time they reach middle age. The expected changes are likely to hit them hard and threaten key forest functions in the decades ahead. However, appropriate management shall enable to increase the forest habitat's adaptability. This is shown by the results of the Forests and Climate Change research programme conducted by the Swiss Federal Office for the Environment FOEN and the Swiss Federal Institute for Forest, Snow and Landscape Research WSL since 2009.

Climate change is happening so quickly that a question mark hangs over whether forests can adapt accordingly without human interference and can continue to perform their various functions such as timber production, protection against natural hazards and providing a recreational space for the public. In Switzerland, temperatures have already risen by around 1.9°C since the beginning of industrialisation. Even keeping global warming down to the 1.5-2°C target set by the Paris Agreement on climate change will yield a further increase of 1-2°C.

For the Swiss forests, this warming trend will involve vegetation zones shifting 500-700 metres higher in altitude. Thus, in future, broadleaf trees will increasingly thrive in lower-lying mountain forests which are currently dominated by conifers. Rising temperatures and drought levels during the growing season are exerting stress on trees and are increasing the risk of forest fires and exacerbating attacks by harmful organisms. This affects Norway spruce, for example, which is more susceptible to bark beetle infestation in prolonged dry spells. In future, it will be less common at lower elevations, while the conditions will be increasingly favourable to more drought-tolerant species such as the sessile oak.

Foresters and forest owners should already tailor the management of their forests to these future conditions. With a view to ensuring a sound empirical basis for this, in 2009 the Swiss Federal Institute for Forest, Snow and Landscape Research WSL and the Federal Office for the Environment FOEN launched the Forests and Climate Change research programme (see box 1). The results provide a comprehensive overview, unique for Central Europe, of the effects of climate change on trees and on the various functions of forests.

Safeguarding forest functions against the backdrop of climate change

The research results show that while forests can adapt to climate change to a certain extent, they are unlikely to be capable of continuing to perform their functions – so natural-hazard protection, the increasingly vital production of timber as a renewable raw material and energy source or their recreational function – everywhere to the extent we have become used to. A major disruptive event such as the forest fire that happened above Leuk in the Swiss canton of Valais in the hot summer of 2003 can undermine forests' natural function of providing protection from natural hazards and can require costly measures such as afforestation and avalanche barriers. It will take decades before the forests' full protective function is restored there. As a result of climate change, such events may become a more frequent occurrence in future.

To avert the loss of such functions, the research programme devised various management strategies adapted to changing climatic conditions. In particular, they result in a greater increase in the diversity of the tree species. How a forest is affected by climate change and what type of management makes it more able to cope with the new climatic conditions depend decisively on the particularities of the relevant site, especially soil depth, water supply and slope exposure. These conditions are changing from site to site and must be viewed in the context of the management of the forest. In this way, for example, areas in high-resolution site maps can be shown where the climate-sensitive Norway spruce can continue to thrive (box 2). Currently, tree-species recommendations are being examined in forest tests along with the cantonal forestry offices and associations of forest owners and environmental and forestry industry associations.



Mixed forest with oaks (foreground), beech and silver fir.
([click to enlarge](#))
Photo: Peter Brang (WSL)



Mixed forests help to minimise the risk of diminishing certain forest functions. ([click to enlarge](#))
Photo: Peter Brang (WSL)

Copyright Notice: The Swiss Federal Research Institute WSL provides the artwork for imaging of press articles relating to this media release for free. Transferring and saving the images in image databases and saving of images by third parties is not allowed.

Box 1: Forests and Climate Change research programme

The purpose of the Forests and Climate Change research programme launched by WSL and the FOEN in 2009 was to develop the relevant knowledge bases and valid decision-making tools. More than 40 projects have been carried out and compared with or supplemented by international research findings. Apart from WSL, the University of Basel, ETH Zurich, the Paul Scherrer Institute in Villigen (canton of Aargau), the School of Agricultural, Forest and Food Sciences in Zollikofen (canton of Bern), the Institute for Applied Plant Biology in Schönenbuch (canton of Basel-Landschaft), Bern-based company Meteotest and a number of engineering firms have been involved. The FOEN is providing 11 million Swiss francs in funding for this programme, while WSL and other research institutions are also investing a lot of funding. Some results and conclusions arising from the programme will be presented on 29 November 2016 at the *Forum für Wissen 2016: Wald und Klimawandel*, a meeting of specialists that is open to the public which is being held at the WSL site in Birmensdorf (www.wsl.ch/forum) (in German).

Box 2: Practical implementation as a key concern

The practical implementation of the research results was a central concern of this research programme from the start. In Swiss forests, growing conditions, determined for instance by soil depth and moisture and by slope exposure, often vary over a small area and are shown on high-resolution site maps. These have proven themselves as a planning tool for those involved in forest activities, for example for measures in protection forests. A series of research projects have addressed the question of how the forest sites of today change in various climate scenarios and what long-term effects this will have on forests. Furthermore, specific recommendations are currently being drafted regarding forest management and the selection of sustainable tree species. For example, currently, tree-species recommendations from the programme are being consolidated in forest tests along with the cantonal forestry offices and associations of forest owners and environmental and timber industry associations.

The research programme's findings also serve the purpose of implementing Article 28a entitled "Vorkehrungen zum Klimawandel", which the Swiss Federal Parliament incorporated into the Forest Act in its revision in April 2016. They also contribute to the implementation of the strategy "Adaptation to climate change in Switzerland" and "Forest policy 2020" adopted by the Swiss Federal Council in 2012.

Contacts