

Climate change in Switzerland: adaptation and mitigation

March 14, 2014 | Andri Bryner

Topics: Biodiversity | Ecosystems | Society

Southern Switzerland emerges as a hotspot of the effects of climate change. The bark beetle is putting spruces all over Switzerland under increasing pressure and groundwater temperatures are raising. These are three of many statements from the report «CH2014-Impacts», which deals with the quantitative consequences of climate change for Switzerland. It has been produced under the direction of the Oeschger Center for Climate Change Research of the University of Bern.

More than 20 research groups from all over Switzerland – among these also Eawag – have worked on the climate change impacts report during the past two years. The unprecedented project was initiated and coordinated by the Oeschger Center of the University of Bern; it was financially supported by the Federal Office for the Environment (BAFU) and MeteoSchweiz. In its investigations into seven subject areas – from glaciers and water balance to woods, biodiversity and agriculture to health and energy – the researchers took the so-called «CH2011 Scenarios» as their starting point for the future development of temperature and precipitation in Switzerland. From these climate scenarios they derived concrete impacts. With this uniform basis the numerous research groups were able to feed the same data into their models and thus make the results comparable. «This approach provides valuable foundations for the development of adaptation strategies», says Christoph Raible from the Oeschger Center for Climate Change Research of the University of Bern, which coordinated the project. The results of the «CH2014-Impacts» project confirm existing knowledge concerning the consequences of climate change and provide new findings. For example, previous assessments concerning changes in the Swiss glaciers have been clearly corroborated: if no radical climate policy measures are taken, around 90 percent of the Swiss glaciers will disappear by the end of this century. Around half of the remaining glacial ice will already have melted away by 2035.

Winners and losers in the forest

«CH2014-Impacts» shows differentiated developments for forests: in low locations in inneralpine valleys that are already very dry today – such as Saastal in Wallis, for example – the forest reacts very sensitively. Just a small additional increase in heat has consequences. The tree population is threatened by weaker growth and comes under increased pressure from bark beetles. This also reduces the protective effect against avalanches and rockfalls. Things look different on the alpine treeline, where tree growth is increasing. This has positive results for the protective effect as well as for wood production and carbon storage. In many cases, the forests will not show serious changes until towards the end of this century. But according to the researchers, forest tending already has to be adjusted now to the more long-term developments to be expected.

Major regional differences

The «CH2014-Impacts» report clearly shows the major regional differences in the effects of climate change. For example, Tessin in particular is being confronted with negative consequences of temperature increase. The hot phases with so-called tropical nights could extend to a duration of up to two months. Not only people would suffer from this. Cows for example would be threatened by heat stress, and the dryness would be a problem for the forests. According to another result of the report, the sensitive south of Switzerland has to expect striking effects of climate change – «Even if globally

effective climate protection measures are taken», says Raible.

On the Swiss Plateau, on the other hand, as long as effective climate policies manage to keep the effects within bearable limits, positive effects are also to be expected. In wine-growing, for example, where warmer conditions will allow the cultivation of additional grape varieties. Without climate protection measures, it is to be expected that problematic consequences will be dominant. For example, stronger fluctuations must be expected in the outflows of rivers, and the temperature of the groundwater may rise – with possibly negative consequences for drinking water quality. There will be a high turnover in the species composition of bird and plant-life. By the end of the century, increasingly unsuitable climatic conditions will, for example, be endangering the survival of spruce and beech, which are now the most widespread types of tree in the midland.

Reduction of greenhouse gas emissions urgently needed

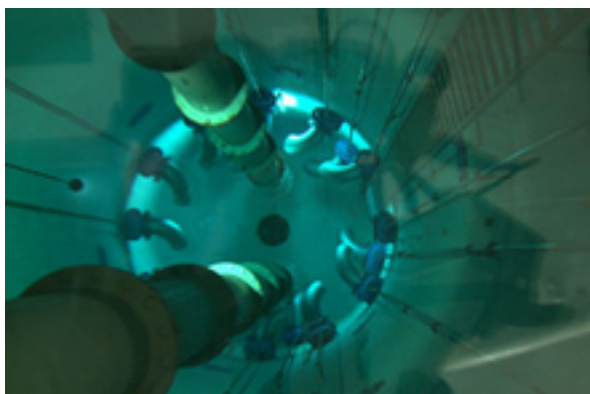
One conclusion of «CH2014-Impacts» is that, with or without climate protection, Switzerland will not be able to do without adaptation. This also includes improved management, such as in agriculture for example – including the choice of varieties and pest control – and in water supply. Due to the changing streamflow in the rivers, it will in future be necessary to be more economical with the use of water. But climate change is also presenting forestry with new challenges. The changing conditions necessitate an adaptation of forest tending and the promotion of biodiversity.

Adaptive measures and improved management are not enough, however, for coping with climate change. A reduction of greenhouse gas emissions still remains an urgent priority. In other words: adaptation and climate protection must go hand in hand. «If we manage to limit climate change, adaptation to its consequences will as a result be easier to achieve and cheaper», says Raible in summary. (Text: Kaspar Meuli)

The report «CH2014-Impacts» can be downloaded free of charge at www.ch2014-impacts.ch. As well as the complete report («CH2014-Impacts - Toward Quantitative Scenarios of Climate Change Impacts in Switzerland») there are summaries in German, French and Italian.



David Livingstone (Eawag) – here at a restored section of the river Töss – is the author of the groundwater chapter in the study.



The temperature of the groundwater may rise – here a groundwater well.

Further information

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