

What are climate change impacts on agriculture observed in Switzerland?

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Climate change

The most obvious climate changes with impact on agriculture we have observed in Switzerland so far are:

- 1) Increase of annual mean temperature with a cumulation of warm years since 1990, with 2011 being the hottest of the last 50 years. Temperature increase is 1.5x faster than over other land masses of the northern hemisphere.
- 2) Total amount of annual rainfall has remained the same so far. However, there are trends of seasonally and regionally changing rainfall patterns. While autumn/winter rainfall has increased, summer rainfall - which is important for Swiss agricultural production - has decreased since the beginning of the 20th century.

(OcCC 2008)

Impact on agriculture

The rising temperatures bring along longer vegetation periods and less frost days, which seems to be positive in the Swiss context at a first glance. However, Switzerland is experiencing a series of negative climate change impacts:

- increased risk of drought during summer, as experienced in the very hot and dry summer 2003: grassland, which is the main fodder basis for Swiss dairy cows, suffered from yield reductions of 20% on average due to drought. The most important pillar of farm incomes had to bear severe losses (Keller and Fuhrer 2004).
- higher summer temperatures also have a direct impact on Swiss livestock: the risk of heat stress during summer is increasing, especially in the Southern parts of Switzerland, which leads to a decrease in productivity;
- we also observe an increase in pests and diseases due to a) increased emergence in spring after milder winters, b) an increase in population cycles due to longer vegetation periods (eg. *Cydia pomonella*), c) an increase of invasive species from South, as the cold barrier effect of the Alps is reduced (eg. *Rhagoletis completa*);
- more extreme weather events such as prolonged dry periods during summer, hail storms and floods have become a major problem, since they can severely affect yields.

Due to the complex topography in Switzerland (Alps, Jura mountain range, hilly areas, valleys with different orientations, Central Plateau), the effects of climate change vary between regions, and suitable areas for specific farming activities are shifting.

Adaptation needs

The biggest challenge is to know what the changes will be at a specific location, and provide agricultural stakeholders with the required information so they can innovate and maintain or even increase their productivity.

This challenge is reflected in the objectives of the Swiss climate strategy for agriculture (FOAG 2011). The strategy has been jointly developed by the agricultural stakeholders and is of voluntary nature. It has a two-fold objective with a time horizon of 2050. The first objective aims at adapting to climate change and thus maintaining or increasing production; the second objective says that, while adapting, greenhouse gas emissions are to be reduced by one to two thirds, depending on the development of food consumption patterns.

Accordingly, priority is given to fields of action which are expected to serve both objectives. The most important ones are:

- Livestock breeding, feeding and grazing management;
- Soil function improvement through management of soil carbon and reduction of compaction and erosion risks;
- Fertiliser management and use of nitrogen according to new situations and requirements;
- Land use planning at various levels, in accordance with identified potentials and suitability of sites for farming activities.

Thank you for your attention!

References

[Federal Office for Agriculture \(FOAG\) \(2011\)](#) Swiss climate strategy for agriculture. Bern, 46 pp

[Keller F, Fuhrer J \(2004\)](#) Die Landwirtschaft und der Hitzesommer 2003. Agrarforschung 11(9): 403-410

[OcCC \(eds\) \(2008\)](#) Das Klima ändert - was nun? Der neue UN-Klimabericht (IPCC 2007) und die wichtigsten Ergebnisse aus Sicht der Schweiz. Bern, 47 pp