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Grain and no rain? - Perception of climate change and adaptation measures of mountain farmers in the canton of Grisons, Switzerland

The strongest climate change effects in Switzerland are expected in the Alps (see NCCS, 2022). If global greenhouse gas emissions continue to increase unchecked, a warming of 2-4 °C is expected in the Alps from the middle of the 21st century. Winter precipitation is likely to increase, but is more likely to be in the form of rain than snow due to warmer temperatures. These changes will have a significant influence on the future of mountain agriculture. Mountain agriculture is furthermore the most vulnerable form of Swiss agriculture because it faces many challenges that are more exacerbated compared to the lowlands: steep slopes, poor infrastructure, lack of skilled labour, low yields, natural hazards or predators. Though farmers are financially supported through special measures and can count on the popularity of regional and/or organic products, changes in climate could lead to further losses of output and increase vulnerability in the near future.

To address these challenges, a vulnerability analysis of the land use systems in the mountains with a case study on the canton of Grisons in eastern Switzerland is being carried out as part of the EU project MOVING. We focus in particular on a cooperative of farmers who produce organic grains in the mountain zones (approx. 600 to 1600 m.a.s.l.) as a diversification strategy alongside cattle farming. Diversification towards more plant-based products is a key strategy to mitigate climate change, but if vulnerability to change is high, this form of agriculture may not be resilient. In this case study we want to assess perceptions of changes and risks, as well as proposed adaptation measures. At the end of 2021, we conducted a survey among the ca. 170 cooperative members and received 35 complete responses from grain producers. The results were then discussed and reviewed in an online workshop with producers, researchers and policy makers.

The survey was structured according to a given set of "drivers of change», i.e. factors that influence the vulnerability of yields, such as temperature and precipitation, but also socio-economic factors. Farmers were asked to rate the relative importance of these drivers and describe how they perceive them (increasing, decreasing, etc). The results show that farmers perceive changes in water availability and extreme weather events as the most threatening drivers in the context of climate change. Some have already taken adaptation measures, aimed at storing water, irrigating or managing the soil to retain moisture. However, other drivers of change have been rated higher. Soil quality, availability of land, availability of adapted cultivars and changing agricultural policies are mentioned as the most important factors affecting production overall. Less than half of farmers said that they would like more support to adapt to biophysical drivers of change. In summary, the effects of climate change are already being felt in the fields and are affecting yields, but non-biophysical factors are perceived to have an even greater impact.

Bibliographic references

NCCS (2022). *Alps*. National Centre for Climate Services Switzerland, https://www.nccs.admin.ch/nccs/en/home/regions/grossregionen/alps.html, visited 05.07.2022.