

**Topic:** Projecting climate change impacts on agriculture in European regions

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## **Assessing the role of farm-level adaptation in limiting the local economic impacts of more frequent extreme weather events in Dutch arable farming systems.**

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The expected increase in extreme events frequency is likely to considerably affect future crop productivity. Appropriate adaptation measures in agricultural systems should be identified according to the main climate risks expected in a region and taking into account the role of decisions made at the farm level. Yet, there is limited understanding of the interplay between local production capabilities, regional climatic changes and more general socio-economic conditions. We propose a method that combines local productivity factors, economic factors, crop-specific sensitivity to climatic extremes, and climate change scenarios, to assess future economic impacts of extreme events on agricultural systems. Our assessment is spatially explicit and uses discounted time series of cash flows taking into account expected impacts on yield and crop quality, to estimate changes in the expected net present value of agricultural systems. We also assess the economic feasibility of a portfolio of adaptation measures by considering their initial investments, annual costs, and effectiveness in reducing crop damage. We apply the method to investigate potential economic impacts of extreme events in arable farming systems in the Netherlands in period around 2050. We find that the expected increase in frequency can substantially undermine the economic viability of Dutch arable farming systems. The results indicate considerable differences among regions: some regions are severely impacted by all extremes, while others consistently demonstrate high resilience. Though the exact magnitude of the impacts remains highly uncertain, adaptation measures should nevertheless be regarded as no-regret strategies, since they alleviate both economic impacts and uncertainty around impact magnitude.