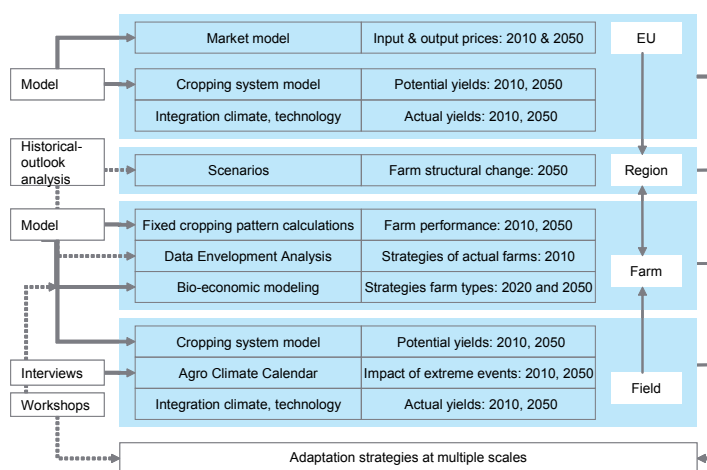


# Climate change adaptation in agriculture: multi-scale modelling and stakeholder participation in the Netherlands

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## Introduction

Agriculture evolves due to changes in socio-economic, policy, technological and climatic conditions (including extreme events and pests and diseases). Thus, there is a need to identify adaptation strategies that: **1** - apply to these new contexts of farming, **2** - are effective in achieving climate-robust agricultural landscapes, **3** - contribute to social, economic and environmental objectives, and **4** - are meaningful for regional and local stakeholders.



## Methodology

- Assess adaptation of agriculture under climatic, socio-economic and technical changes at multiple scales
- Combining crop and farm system models (quantitative) for gradual impact changes *and* a participatory approach for the impact assessment of extreme events and pests and diseases (semi-quantitative)
- Using EU level productivity and market analysis to provide the macro context for the regional and farm level

This is a first application in the province of Flevoland, the Netherlands. The methodologies have standalone value but are also integrated to define and assess adaptation strategies at multiple levels.

## Example results

The Agro Climate Calendar (ACC) for seed potato that was developed to assess extreme weather events

| Climate factor          | Vulnerable period | Meteorological description   | Farm management                         | Impact on crop        | Crop losses (%) |
|-------------------------|-------------------|--|---|-----------------------|-----------------|
| Wet field               | Oct – Apr         | Period of 21 days of more than 0.5 mm rainfall on 75% of the days                            | Plowing and preparation of planting bed | Delayed planting date | -               |
| High intensity rainfall | May – Sep         | Daily precipitation of at least 45 mm or at least 60 mm in three days                        | -                                       | Rotting of the tubers | 25 – 75         |
| Heat wave               | Jul – Aug         | Heat wave (at least 3 days with more than 30°C in a period of at least five days above 25°C) | -                                       | Second-growth         | 25 – 75         |

## Conclusion

The effectiveness of adaptation strategies on economic, environmental and social indicators is explored for different crops, farm types and regions, resulting in a comprehensive assessment of impacts and adaptation strategies to climate change at multiple scales in different scenarios.

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