

VU Research Portal

Agricultural land systems

Pinto Nunes NogueiraDiogo, V.

2018

document version

Publisher's PDF, also known as Version of record

[Link to publication in VU Research Portal](#)

citation for published version (APA)

Pinto Nunes NogueiraDiogo, V. (2018). *Agricultural land systems: Explaining and simulating agricultural land-use patterns*. [PhD-Thesis - Research and graduation internal, Vrije Universiteit Amsterdam].

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

E-mail address:

vuresearchportal.ub@vu.nl

**ASSESSING LOCAL AND REGIONAL ECONOMIC IMPACTS
OF CLIMATIC EXTREMES AND FEASIBILITY OF ADAPTATION
MEASURES IN DUTCH ARABLE FARMING SYSTEMS**

Abstract: We propose a method that combines local productivity factors, economic factors, crop-specific sensitivity to climatic extremes, and future climate change scenarios, to assess potential impacts of extreme weather events on agricultural production systems. Our assessment is spatially explicit and uses discounted time series of cash flows taking into account expected future impacts on yield and crop quality, to estimate changes in the expected net present value (NPV) of agricultural systems. We 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 weather events in arable farming systems in the Netherlands around 2050. We find that the expected increase in extreme weather events frequency can severely affect future productivity potential. Particularly, heat waves, warm winters, and high intensity rainfall are expected to substantially undermine the future economic viability of Dutch arable farming systems. The results indicate considerable differences between regions in terms of vulnerability to climatic extremes. The findings are robust to a wide range of scenarios and suggest that the interactions between economic factors and management practices (particularly, crop specialisation) are decisive drivers of the economic viability of agricultural systems under more frequent climatic extremes. However, the exact magnitude of the impacts remains highly uncertain, as we do not consider endogenous interactions in market conditions resulting from climate change and socio-economic developments. Nevertheless, crop adaptation measures should be regarded as no-regret strategies, since they alleviate both economic impacts and uncertainty around impact magnitude.

Keywords: Climate change; Extreme weather events; Arable farming; Impact assessment; Adaptation; Spatial Analysis

This chapter originally appeared as: Diogo, V., Reidsma, P., Schaap, B., Andree, B.J.P., Koomen, E. (2017), *Assessing local and regional economic impacts of climatic extremes and feasibility of adaptation measures in Dutch arable farming systems*. *Agricultural Systems* 157: 216–229. doi: 10.1016/j.agsy.2017.06.013