Climate Adaptation for Rural arEas (CARE)

Midterm assessment
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Climate Adaptation for Rural Areas Knowledge for Climate

WAGENINGEN UR For quality of life

KWR Watercycle Research Institute

VU VRIJE UNIVERSITEIT AMSTERDAM

THE UNIVERSITY of EDINBURGH

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Deltares Enabling Delta Life

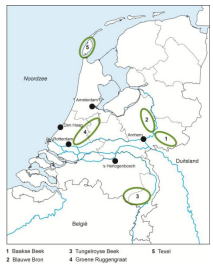
Central Aim

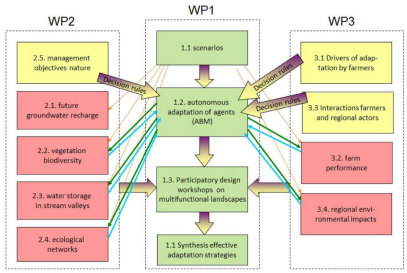
To generate the fundamental knowledge that is necessary to design and evaluate adaptation strategies to cope with the impacts of climate change on rural areas in the Netherlands

Focus on biophysical **and** human response

Structure of CARE and Method

- Three work packages
- Focus on integration
- Case studies
- Agent-based modeling
- Stakeholder involvement
- Design workshops





First Results (selection)

- Development of agent-based model RULEX
- Conceptual link between RULEX and other models
- Application of the model to Baakse Beek area
- Committed and enthusiastic stakeholders
- Publications and presentations

Agent-based Model RULEX

- Why model land use change?
  - Trends in land use determine functioning of area
  - Spatial patterns determine functioning of individual sectors
  - Most other projects within CARE need to know the spatial delineation of the sector they focus on

Agent-based Model RULEX

- Simulates categorical land use: arable, dairy, pigs and poultry, horticulture, mixed, nature
- Basic assumption: Land use change is brought about by land changing owner or tennant
- Land exchange takes place on a spatially explicit landscape

Scientific aspects of RULEX

- Empirically grounded through statistical analysis
- Until now land land market / land exchange ABMs mainly focus on urban areas
- Nature management decisions unexplored subject
- RULEX is built for Baakse Beek area and will be applied to other areas. Provides means to test robustness and explore patterns in farmer and nature manager decisions and competition

How RULEX works:

- Start with land use map and census data from 2009
- Estimate who wants to sell and who wants to buy
- The sellers put parcels on the market: they select the least preferred ones
- The buyers evaluate the for-sale parcels; when they like them, they buy/lease them
- After parcels change user:
  - Parcels get assigned the land use of the new owner/tennant
  - Farmers' attributes (size and age) get updated

How do we know who sells and who buys?

- Appears to be predictable from
  - Farmer age
  - Farm size (ha)
  - Farm size (NGE)
  - Land use

  Available from agricultural census

- For example:
  - The probability of being an expander increases with economic size, and is generally higher for dairy farmers
  - The probability of being a shrinker increases with age, and, for dairy farmers, decreases with economic size

Multifunctional farming

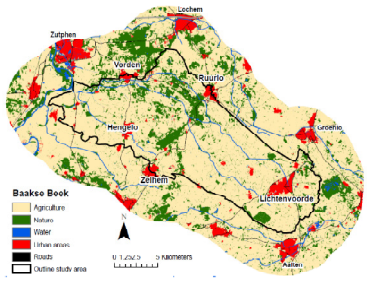
- Same data can be used to predict uptake of diversification:
  - Farmer age
  - Farm size (ha)
  - Farm size (NGE)
  - Land use
- In a next version of the ABM a layer of e.g. "probability to participate in agri-ecological schemes" will be added

Baakse Beek Case Study

Social Ecological Systems: connect environmental focus with governance approaches

Three spatial key principles to enhance the adaptive capacity of the physical landscape:

- Size
- Heterogeneity
- Connectivity



Example: Heterogeneity

Water: designate specific locations for water retention after extreme rainfall to avoid damage elsewhere

Agriculture: increase the variation in moist conditions on farms to dampen impacts of weather variability

Nature: Restore abiotic gradients in and around nature areas for wet heath lands and wet grass lands

Next steps

Are these spatial principles suitable for planning and design processes? Criteria:

- Spatially explicit
- Connected to function
- Easy to visualize
- Flexible application

Human response: application of RULEX

Learning feedbacks between science and practice

Discussion