



IGLO: Integrating Global and Local assessment models

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 SPIN lab Spatial Information Laboratory

Project context – why we think we are different....

- Funded by Netherlands Organisation for Scientific Research (NWO) and Knowledge for Climate
- National Partnership for Sustainable Earth Research (NPDA)
- Application followed NWO (review) procedures not KfC
- 2 post doc researchers
 - Dr. Sanneke van Asselen at FALW/IvM (Sept. 2010 - Jan. 2013)
 - Dr. Eric Koomen at FEWEB/RE (May 2010 - Nov. 2013)
 - Supervised by Prof. Verburg and Prof. Rietveld



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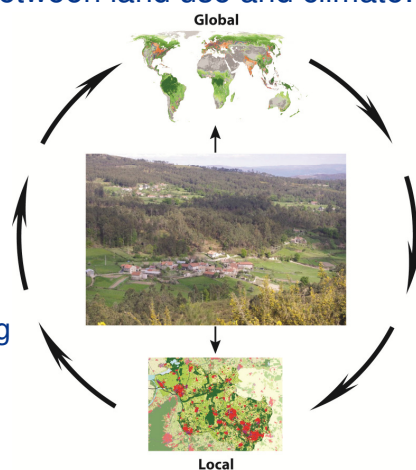
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Project objectives

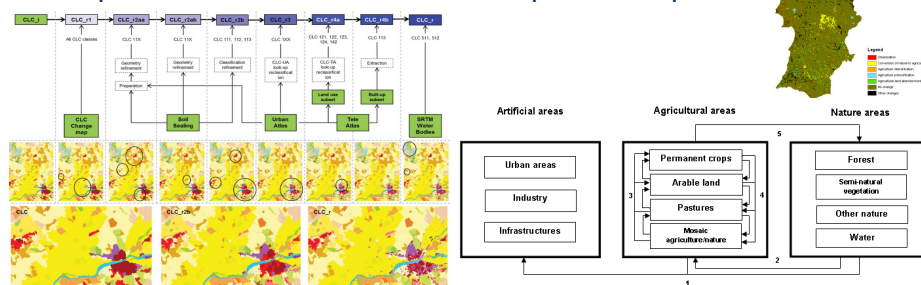
- Improve integrated multi-scale modelling frameworks to assess the interrelationships between land use and climate:

- Understanding land-use change processes across different scales
- Interactions between socio-economic and biophysical processes in land use
- Implementation of new land-use change models in operational land-use modelling frameworks



(1) Understanding land-use processes at local scale

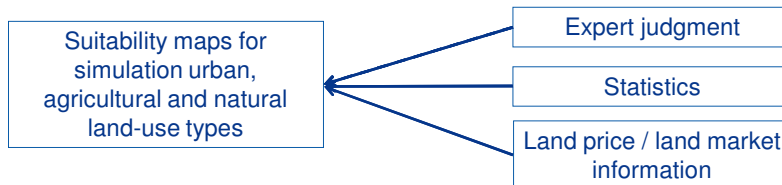
- Analysing land-use change in several European countries
- With EC-JRC to develop EU-ClueScanner100 model
- Helped refine a land-use base map for Europe



Batista e Silva, Lavalle & Koomen, 2012, Jnl. of Land Use Science
Diogo & Koomen, 2012, Cartographica

(2) Socio-economic and biophysical interactions

Unified assessment framework for land suitability

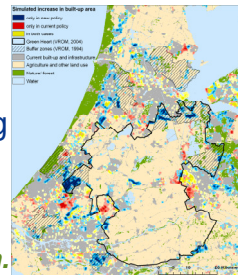


Koomen et al., ERS-2011; AGILE-2012

Impact of zoning regulations

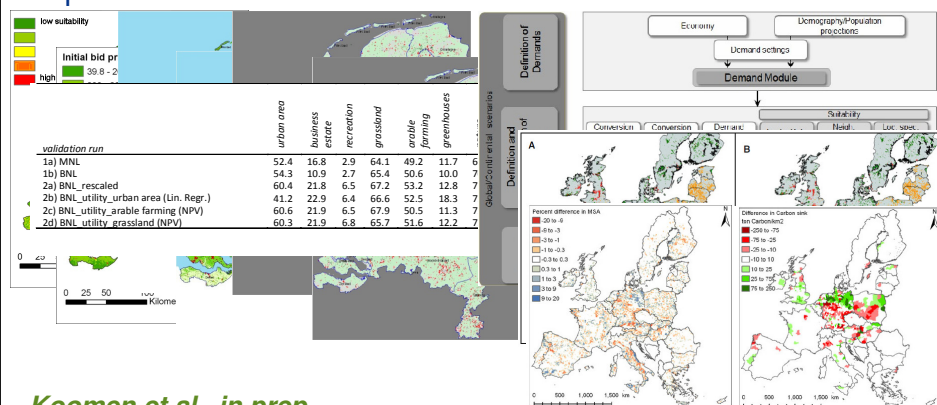
- Empirical analysis of impact restrictive zoning on urbanisation in the Netherlands, used to inform SEA on new spatial planning strategy

Koomen & Dekkers, subm., Cities and Nature book Ch.



(3) Improve operational modelling frameworks

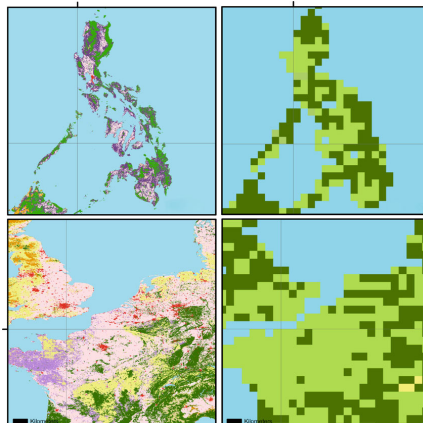
Implement in Land Use Scanner and EU-ClueScanner



(1) Understanding land-use processes at global scale

- Most global land-change models: coarse resolution (0.5°), one pixel represents the dominant land cover, land management simplified
- Simplifications likely have impacts for the increasing applications/assessments global models are used for

Verburg, Van Asselen et al. 2012, Landscape Ecology



Developing a new *Land Systems* classification system

1. Develop a new representation of land cover and land use.

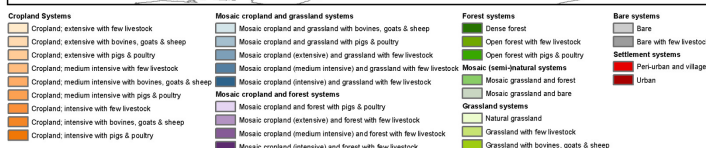
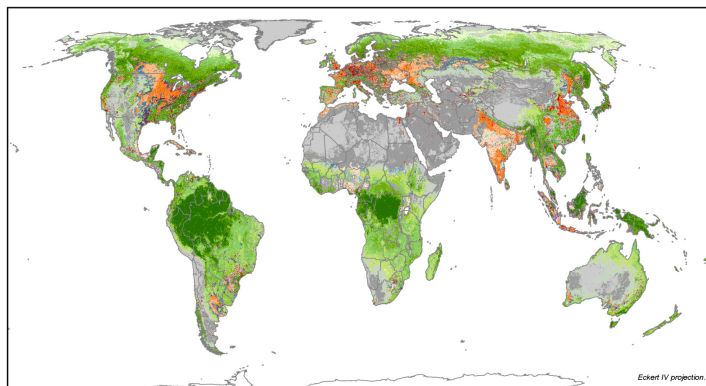
- Relatively high resolution ($\sim 10 \times 10$ km).
- Mosaic landscapes.
- Include direct measurements of land-use:
 - Agricultural intensity.
 - Livestock type and density.

Land Systems

Van Asselen and Verburg, 2012, Global Change Biology.

2. Use Land Systems as basic modelling units in a new global land change model.

Land Systems classification



(2) Socio-economic and biophysical interactions

Land System study

- Binominal logistic regressions to estimate the probability of occurrence of a Land System

Van Asselen and Verburg, 2012, Global Change Biology

Wetland conversion study



- Binominal logistic regression to estimate the probability of wetland conversion worldwide + analysis of 105 case studies on wetland conversion

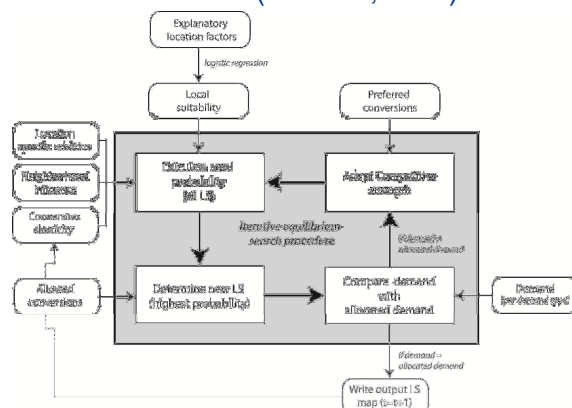
Van Asselen et al., submitted to Global Environmental Change

(3) Improve operational modelling frameworks

Use Land Systems as spatial entities in a new global land-change model to predict future land change more accurately and improve environmental assessments (**IMAGE**, PBL).

Some model highlights

- Land Systems
- Multiple demands
- Intensification vs. extensification.



Future work

- Finalize *Land-use suitability framework* paper
- Write *global land change model* paper
- Shift focus on explaining and simulating land-use *change* (transition analysis, conversion costs)
- Advise PBL on defining land suitability in Dutch Delta scenario project
- Assist EC-JRC in downscaling land change scenarios
- Help PBL implement Land Systems as spatial entities in a new global land-change model
- International workshop *Past as key to future* 12/12/2012



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