

Platform for land use modeling in The Netherlands

LUMOS pro

Examining land use change modelling conceptualizations and algorithms for planning and policy evaluation purposes at different scales

Jonas van Schroyen Lantman

WAGeningen UR
Landbouwkundige en Plattelandschapswetenschappen

21 november 2007 GIN-Congres 1

Platform for land use modeling in The Netherlands

LUMOS pro

Outline

1. Project framework
2. Objective and methodology
3. Relevance
4. Discussion

21 november 2007 GIN-Congres 2

Platform for land use modeling in The Netherlands

LUMOS pro

Project framework

Land use modelling

- Prescriptive
- Descriptive

21 november 2007 GIN-Congres 3

Platform for land use modeling in The Netherlands

LUMOS pro

Project framework

- Lumospro consortium
 - MNP (Netherlands Environmental Assessment Agency)
 - WUR (Wageningen University and Research Centre)
 - VU (Free University)

21 november 2007 GIN-Congres 4

Platform for land use modeling in The Netherlands

LUMOS pro

Overall objective PhD

To improve the theoretical and practical insight into the usability of different land use change modelling **conceptualizations** and **algorithms** for planning and policy application purposes.

21 november 2007 GIN-Congres 5

Platform for land use modeling in The Netherlands

LUMOS pro

Conceptualizations <-> Algorithms

```

    graph TD
      A[Land Use Cover /Change] --> B[LUCC Conceptualization]
      A --> C[LUCC Conceptualization]
      B --> D[Algorithm]
      B --> E[Algorithm]
      C --> F[Algorithm]
      C --> G[Algorithm]
      D --> H[Model]
      E --> H
      F --> I[Model]
      G --> I
  
```

21 november 2007 GIN-Congres 6

Platform for land use modeling in The Netherlands **LUMOS pro**

Conceptualizations <-> Algorithms

Example

Historic land use change can be extrapolated into the future (Conceptualization)

↓

Markov (algorithm)

↓

Land use change simulation model

21 november 2007 GIN-Congres 7

Platform for land use modeling in The Netherlands **LUMOS pro**

Conceptualizations <-> Algorithms

```

    graph TD
      NI[Neighborhood interaction] --> CA[Cellular Automata]
      NI --> L[Logit]
      H[Historic] --> L
      H --> M[2nd order Markov chains]
      S[Suitability] --> ANN[Artificial Neural Networks]
      S --> VT[Von Thunen]
      CA --> EE[Environment Explorer]
      L --> LUS[Land Use Scanner]
      M --> GEOMOD[GEOMOD]
      ANN --> LTM[Land Transformation Model]
  
```

21 november 2007 GIN-Congres 8

Platform for land use modeling in The Netherlands **LUMOS pro**

Definitions

Land use change modelling conceptualization

- A viewpoint on how driving forces of land use change can be modelled.

Land use change modelling algorithm

- A mathematical calculation method to allocate land use change, based on a land use change conceptualization.

21 november 2007 GIN-Congres 9

Platform for land use modeling in The Netherlands **LUMOS pro**

Overall objective

To improve the theoretical and practical insight into the usability of different land use change modelling **conceptualizations and algorithms** for planning and policy application purposes.

21 november 2007 GIN-Congres 10

Platform for land use modeling in The Netherlands **LUMOS pro**

Sub-objectives

1. To increase our insight into the applicability domain of various land use change modelling conceptualizations
2. To improve our insight into the practical applicability of various land use change modelling conceptualizations and algorithms in diverse planning and policy practices
3. To increase our insight into the role of several dimensions of scale on the applicability of various land use change modelling conceptualizations
4. To improve our insight into the applicability of various land use change modelling conceptualizations and algorithms in diverse planning and policy practices on several dimensions of scale

21 november 2007 GIN-Congres 11

Platform for land use modeling in The Netherlands **LUMOS pro**

Objective 1

1. To increase our insight into the applicability domain of various land use change modelling conceptualizations
2. To improve our insight into the practical applicability of various land use change modelling conceptualizations and algorithms in diverse planning and policy practices
3. To increase our insight into the role of several dimensions of scale on the applicability of various land use change modelling conceptualizations
4. To improve our insight into the applicability of various land use change modelling conceptualizations and algorithms in diverse planning and policy practices on several dimensions of scale

21 november 2007 GIN-Congres 12

Platform for land use modeling in The Netherlands

LUMOS pro

Objective 1

Example result applicability domain

	Assessment criterion 1	Assessment criterion 2
Land use change modelling conceptualization 1		
Land use change modelling conceptualization 2		
.....		

21 november 2007 GIN-Congres 13

Platform for land use modeling in The Netherlands

LUMOS pro

Objective 2

1. To increase our insight into the applicability domain of various land use change modelling conceptualizations
2. To improve our insight into the practical applicability of various land use change modelling conceptualizations and algorithms in diverse planning and policy practices
3. To increase our insight into the role of several dimensions of scale on the applicability of various land use change modelling conceptualizations
4. To improve our insight into the applicability of various land use change modelling conceptualizations and algorithms in diverse planning and policy practices on several dimensions of scale

21 november 2007 GIN-Congres 14

Platform for land use modeling in The Netherlands

LUMOS pro

Objective 2

Example result:

	Process resemblance	Spatial resemblance
Land use change modelling conceptualization 1		
Land use change modelling conceptualization 2		
Land use change modelling conceptualization 3		

21 november 2007 GIN-Congres 15

Platform for land use modeling in The Netherlands

LUMOS pro

Objective 3

1. To increase our insight into the applicability domain of various land use change modelling conceptualizations
2. To improve our insight into the practical applicability of various land use change modelling conceptualizations and algorithms in diverse planning and policy practices
3. To increase our insight into the role of several dimensions of scale on the applicability of various land use change modelling conceptualizations
4. To improve our insight into the applicability of various land use change modelling conceptualizations and algorithms in diverse planning and policy practices on several dimensions of scale

21 november 2007 GIN-Congres 16

Platform for land use modeling in The Netherlands

LUMOS pro

Objective 3

Example result per land use change process

	Scale level 1	Scale level 2	Scale level 3
Land use change modelling conceptualization 1			
Land use change modelling conceptualization 2			

21 november 2007 GIN-Congres 17

Platform for land use modeling in The Netherlands

LUMOS pro

Objective 4

1. To increase our insight into the applicability domain of various land use change modelling conceptualizations
2. To improve our insight into the practical applicability of various land use change modelling conceptualizations and algorithms in diverse planning and policy practices
3. To increase our insight into the role of several dimensions of scale on the applicability of various land use change modelling conceptualizations
4. To improve our insight into the applicability of various land use change modelling conceptualizations and algorithms in diverse planning and policy practices on several dimensions of scale

21 november 2007 GIN-Congres 18

Platform for land use modeling in The Netherlands

LUMOS pro

Objective 4

Example result per land use change process

	Spatial resemblance	Process resemblance	Scale level
Land use change modelling conceptualization 1			
Land use change modelling conceptualization 2			

21 november 2007 GIN-Congres 19

Platform for land use modeling in The Netherlands

LUMOS pro

Relevance for society

- Improves usability of land use simulation models for planning and policy

21 november 2007 GIN-Congres 20

Platform for land use modeling in The Netherlands

LUMOS pro

Relevance for own discipline

- Theoretical framework containing applicability domain of land use change modelling conceptualizations is unique in LUCG community

21 november 2007 GIN-Congres 21

Platform for land use modeling in The Netherlands

LUMOS pro

End of presentation

- Questions?
- Discussion

21 november 2007 GIN-Congres 22

