LGN1 – LGN5
Methodological developments and requirements
G.W. Hazeu
LGN in brief

- Raster database (25*25m grid)
- Based on satellite images, Top10Vector and visual interpretation
- 39 classes (main classes urban area, forest, water, agricultural land and nature)
- (last) 5th version of Landelijk Grondgebruiksbestand Nederland (LGN5)
Why LGN?

- Widespread application of GIS in organisations
- Improved computer capabilities made it possible to handle large multi-temporal satellite data sets
- Land use information was needed for environmental policy and spatial planning
  - Example: pollution of phosphorus in Dutch soils - depends mainly on soil type and the area corn crops
LGN1: requirements

- Raster database for use in a GIS, with a resolution of 25 meter.
- Discrimination of the major crop types
- No real accuracy requirements because the product was a first test case
LGN1: methodology

- Single TM image (August 1986)
- Supervised classification in combination with visual delineation of urban areas
- Extensive post-processing: majority filtering, clump and sieve operations
LGN1: results (1)
LGN1: results (2)

- Nr. of classes is limited (17)
- Accuracy (67%) and reliability is poor
- Visual appearance of the database is poor
- Despite the poor accuracy, the usefulness of the product was recognised by users
LGN2: requirements and methodology

- More classes were required
- Accuracy needed to be improved

Stratified multi-temporal approach
- Multi-temporal satellite data
- Stratification using BARS database
LGN2: methodology

1. Aerial photographs → Visual correction and update of BARS database
2. Topographical map → BARS database 1992
3. BARS database RPD → Visual correction and update of BARS database
5. CBS agricultural areas → Satellite images
6. Stratified classification of satellite image and recoding of spectral classes
7. Infrastructure → Multi-temporal classification of agricultural areas per CBS area
8. Greenhouses → LGN2 basic database
9. Heathland → LGN2 basic database
10. Orchards → LGN2 basic database
11. Aerial photographs → Final control basic database
12. Topographical map → Final control basic database
13. Crop database → LGN2 database
14. Final basic database → LGN2 database
LGN2: results (1)
LGN2: results (2)

- Improved accuracy for the entire database
- More classes could be discriminated due to stratification
- Improved visual appearance of the database
- Problems with orchards, greenhouses and mixture classes
LGN3: requirements

- Accuracy improvement for agricultural crops (no mixture classes)
- Accuracy improvement for greenhouses and orchards
- Improvement of the thematic description of nature areas
LGN3: methodology

- Top10-vector: - greenhouses - orchards
  - rasterising

- LGN2 classes
  - merging
  - updating

- Satellite imagery
  - nature areas

- Expert knowledge & ancillary data

- LGN3 database

- crop classification
LGN3: results (1) – nature classes

LGN2

LGN3+
LGN4: requirements and methodology

- Integration with Top10Vector
  - Object classification of agricultural crops
- Monitoring land use changes
  - Limited number of classes (agricultural land, urban area, forest, water, nature, orchards, greenhouses, infrastructure)
LGN4 methodology

- Top10-vector: greenhouses, orchards
- LGN3 classes
- Satellite imagery
- Expert knowledge & ancillary data
- Selection agricultural parcels
- Crop classification
- Updating
- Merging
- LGN4 database
- Top10-vector: tdn code 5203, tdn code 5213
LGN5: requirements and methodology

- Methodology consistent with LGN4
- Monitoring land use changes on 8 main classes
- Obtain accuracy of LGN4
- Implementation in geodatabase
LGN5 = LGN4 methodology

Top10-vector: greenhouses - orchards
- rasterising

LGN4 classes
- merging
- updating

Satellite imagery
- crop classification
- merging

Selection agricultural parcels
- merging

Top10-vector - tdn code 5203 - tdn code 5213

Expert knowledge & ancillary data

LGN5 database
LGN4 = LGN5: results (1)
LGN5 crop database & LGN5 grid
LGN4 = LGN5: results (2) monitoring database

LGN4

LGN5
Future

- Focus on quality and continuity
- Combination LGN - HGN/GIS-nature gives new methodological opportunities
- Actualisation nature classes and tuning with other databases
- New classification techniques (SAR)
- Important new aspect: error modelling
Conclusions

- In more than 15 years time the LGN database has developed into a high quality product
- Integration of other data sources is very important for land use mapping
- Satellite images are still indispensable for mapping crops and as an absolute reference to the actual situation
- LGN4 implements integration with TOP10-vector and change monitoring
- LGN5 continues in the way of LGN4
Thank you for your attention