The Land Cover (LC) and Land Use (LU) maps make use of the rich provision of Walloon geodata

- Earth Observation (EO)
  - Ancillary vector data:
    - Topographic DB (PICC)
    - Cadaster
    - Agricultural parcel (SIGEC)
    - Others DB (Cool heaps, landfills ...)

A new semi-automatic processing chain is developed with open-source software (GRASS GIS, PYTHON, Jupyter Notebook) to map LC

1. Spectral indices (vegetation, brightness, statistics calculation per objects)
2. Segmentation & statistics calculation per objects
3. Supervised LC classification through machine learning classifiers
4. Accuracy assessment (85 to 95%)

LU is derived at the scale of the parcels or urban blocks by combining spatial metrics calculated with the LC and other specific databases

<table>
<thead>
<tr>
<th>LU distribution ratio per urban blocks</th>
<th>Example of the LC map (urban blocks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building (≤ 2.5 m)</td>
<td>Building (&gt; 2.5 m)</td>
</tr>
</tbody>
</table>

Perspectives of SmartPop

- Develop a new method of LU mapping validated by users
- Adapt the updating of the LC map for an application to the whole Walloon region in compliance with the INSPIRE directive
- Propose a dasymetric algorithm to become independent from the NRPP (restricted access)
- Combine population density map with danger to define the population exposure to these hazards
- Integrate the new updated LC map derived from EO data in the dasymetric algorithm
- Improve and precise the dasymetry method thanks to other EO data (improveness)
- Dynamic and spatial modelling of LU and population distribution (RuimteModel – VITO)
- Dynamic population maps with mobile phone data (ULB)

References:

- SmartPop project [Blossem & Belsp (Belgian Science Policy Office] in the frame of the STEREO II program [no. SR/02/2013) Funding]: [http://www.isep.be/marques]

SmartPop Spatial planning of population growth in Wallonia and in Liège for better Smart City management

Dasymetric mapping distributes demographical statistics on the LC map

- Population density map
- LU map
- Dasymetric algorithm

In expecting the SmartPop LU map, the dasymetric algorithm uses the existing Walloon LC (Carte d’Occupation du Sol de Wallonie – COSW) from 2007 with a calibration by population densities derived from the national grid (NRPP)

Population data are available each year per administrative units until the statistical sectors (more precise) or aggregated on 100 m grid [National Register of Physical Persons (NRPP)]

Mean Error = 0.16 hub./pixel (RMSE = 9.20 hub./pixel)
Standard Deviation = 20 hub./pixel

Inputs from before 2007, mix of LC and LU

[no compliance with INSPIRE]