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## Uncertainty in Spatial Planning: causes, implications and possible solutions.

In the Netherlands the Ministry of Housing, Spatial Planning and the Environment promotes digitizing of spatial plans into geographic datasets (DURP initiative). Aim is to have spatial plans that are "digital, exchangeable and comparable". This means that plans should be object-oriented and coded according to the national information model for spatial planning (IMRO). Many municipalities and provinces are working hard to achieve this. The general idea is that when plans are digitized and exchangeable, comparing of spatial plans will not be a problem. This would also give better possibilities for analysis, e.g. for monitoring the effectiveness of spatial planning policies by comparing the plans with real-world developments in land use.

First experiences however show that comparing and analyzing digital spatial plans is not as unproblematic as expected. This has to do with differences in scope and intention (some plans only give global indications of desired future land use, while e.g. municipal plans must be very detailed and precise), differences in scale (related to the reference datasets used for digitizing), and with other typical aspects of data quality and uncertainty: errors in the base datasets, semantic ambiguity, unknown lineage, unknown temporal accuracy, etc. In a case study in the province of Noord-Brabant also other sources of uncertainty came to light: the political process can lead to unclear definitions or last-minute changes that are not documented.

In this paper we explore the various types of uncertainty in spatial plans. We use the taxonomy of uncertainty of Fisher (2005) as starting point and extend it to fit the Dutch spatial planning domain. The taxonomy also is the basis to find possible solutions to deal with the diverse types of uncertainty. One approach is to use fuzzy set techniques to make the global intention of spatial planners visible and quantifiable. Another is to use workflow software to document the lineage and other metadata during geo-processing from base datasets to spatial plan. A few of these possible solutions will be tested in the Noord-Brabant case study.