Abstract: A decision is usually based on some kind of information. In the decision- taking phase it is important to know the extent to which the information about the different alternatives that are to be decided on is reliable. This doctoral thesis focuses on data quality assessment in spatial analysis, and especially on evaluating data usability in the decision- taking phase.

The first focus concerns the situation when information about the accuracy of source data is missing or insufficient. Questionnaires and interviews are used to obtain such information. In an effort to make the survey- situation user-friendlier and to obtain answers that are as complete as possible, a questionnaire template allowing vague responses and imprecise information is developed. The advantage and perhaps also the disadvantage of that concept are the independence of standardised data quality elements, as well as of available metadata. It is shown that a procedure for quality assessment by using a questionnaire allowing vague responses indeed increases the response rate. However, a recommended improvement is to include methods that assure that reliable answers are obtained.

Then the second focus is on the decision-taking phase, where uncertainties in source datasets and their influences on the fitness for use for a specific decision are studied. The goal is to develop a procedure for decision analysis where expected utility measures are used to quantify the effects that uncertainties and errors in source data have on rational decisions. The purpose of this is to endeavour to make the decision-takers more aware of the impact that the uncertainties in the datasets used may have on their decisions. It is shown that standardised data quality elements are extremely useful for evaluating usability, but they have to be transformed into a domain understood by the user. Furthermore, it is shown that the expected utility of each dataset can be a measure of fitness for use in decision analysis. One advantage of such an approach is that it clearly demonstrates the connection between data quality, decisions and environmental and financial costs and benefits. When estimating the probabilities of different events, spatial micro-simulation techniques have proven to be useful. To improve the procedure, however, macro-constraints should also be used for aligning the simulation model.

Three different case studies have been performed. As a result of these studies some basic procedures that are needed for data quality evaluation have been identified, viz. “Data quality assessment by using a questionnaire”, “Construction of artificial perfect datasets”, “Micro- simulation”, “Monte Carlo simulation”, “Artificial decision- maker”, “Decision evaluator”, and “Data variability reporter”. The studies also verify that these procedures can connect to each other. The idea is that they can be arranged in different ways, and hence be used in different contexts.