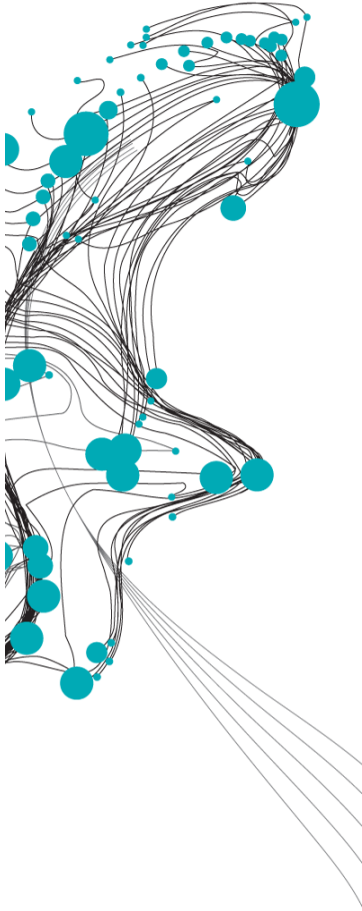


# MANAGEMENT OF (CLIMATE) UNCERTAINTIES IN URBAN DEVELOPMENT PROJECTS



The municipality of Zwolle is looking to develop new residential areas within the city as a result of major housing shortages in the Netherlands. However, due to the position of Zwolle in the IJssel-Vecht Delta, a portion of the city lies within the unembanked space. This includes existing and planned residential areas. In this research, it is researched what uncertainties practitioners experience during the project development process of residential areas in the unembanked space, when during the development process they first become aware of the uncertainties, and how they deal with the experienced uncertainties.

Uncertainties practitioners experience have been derived through document analysis and semi-structured interviews with participants of projects. Data was compared to literature about uncertainty management in the water management domain. This literature distinguishes three uncertainty types, and proposes adequate measures to deal with a given uncertainty type. The three types are: 1) a lack of knowledge (epistemic), 2) unpredictability of a system or phenomenon (ontological), or 3) uncertainty originating from many possible interpretations of a situation (ambiguity) (Table 1).

The study shows that practitioners collectively experience a wide range of uncertainty within projects. But at the individual level practitioners often times experience one uncertainty type over the others. 23 different uncertainty themes were derived from the uncertain situations that were described either in project documents or by participants that were interviewed. The most important uncertainty is related to getting parties on the same page and talking about the same things. Other notable themes included: 1) climate induced future water level increase, 2) integration of the project into the river landscape, and 3) whether one should want to build in the unembanked space.

Practitioners are very aware of the differences in nature between the uncertainties they experienced during the project. Doing more research (epistemic), worst-case scenario planning (ontological), and dialogical learning (ambiguity) were the most used methods for each type of uncertainty. However, the preferred methods to deal with a given uncertainty differed between projects, and in some instances also between individual practitioners in the same project. It is strongly advised to start documenting uncertainties, and acknowledging their presence and effects in projects. It is proposed to apply uncertainty management into the project development process by applying it in similar fashion to risk management, where uncertainties of different types are inventoried and methods to adequately deal with them are decided upon based on the type of uncertainty experienced.

Table 1. Definition of the uncertainty types used in this research and examples of each type of uncertainty

Name	Definition	Example
Epistemic Uncertainty	Uncertainty related to incomplete or imperfect knowledge	What is the magnitude of soil pollution at the project location?
Ontological Uncertainty	Uncertainty due to inherent variability or unpredictability in behaviour of a system or phenomenon	How will climate changes affect future normative water levels and discharge regimes in the river?
Ambiguity	Uncertainty originating from many possible interpretations of a situation (different knowledge frames)	Should you want to build in the unembanked area?

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**Graduation Date:**  
6 June 2023

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