

Addressing Land Subsidence in the Netherlands: A Backcasting Approach

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Introduction

Land subsidence in delta regions can lead to various problems, including damage to both buildings and infrastructure, increased flood risk, and salinization of fresh water resources, particularly when considering impacts of accelerated climate change and sea level rise (SLR) [2]. The backcasting approach starts by envisioning a main vision and long-term objectives or so-called targeted future states. Based on these targeted future states, the scenario development will work backward from these targeted future states to determine the type of interventions and measures required within each area or location to reach one of these targeted future states [Fig.1] [1], and to determine as well what scenarios can be developed.

Methodology

The backcasting approach has started within the NWA-LOSS by envisioning the long-term objectives for the Netherlands regarding addressing land subsidence [3]. The long-term objectives focus on a sustainable vision, including minimum land subsidence as well as minimum socio-economic costs of greenhouse gas (GHG) emissions and other damages [Fig.2c]. In addition to the Business As Usual (BAU), four targeted futures for rural areas were formulated to include different situations of sustainable dealing with land subsidence problem in the Netherlands. To know where each of these targeted future states should be reached, the first step is to carry out statistical analysis and modelling to identify high damage-risk areas of land subsidence [Fig.2a]. The second step is to develop tailored intervention water and land management strategies [Fig. 2b] as well as different scenarios and pathways for addressing land subsidence in rural areas in the Netherlands [Fig. 2d].

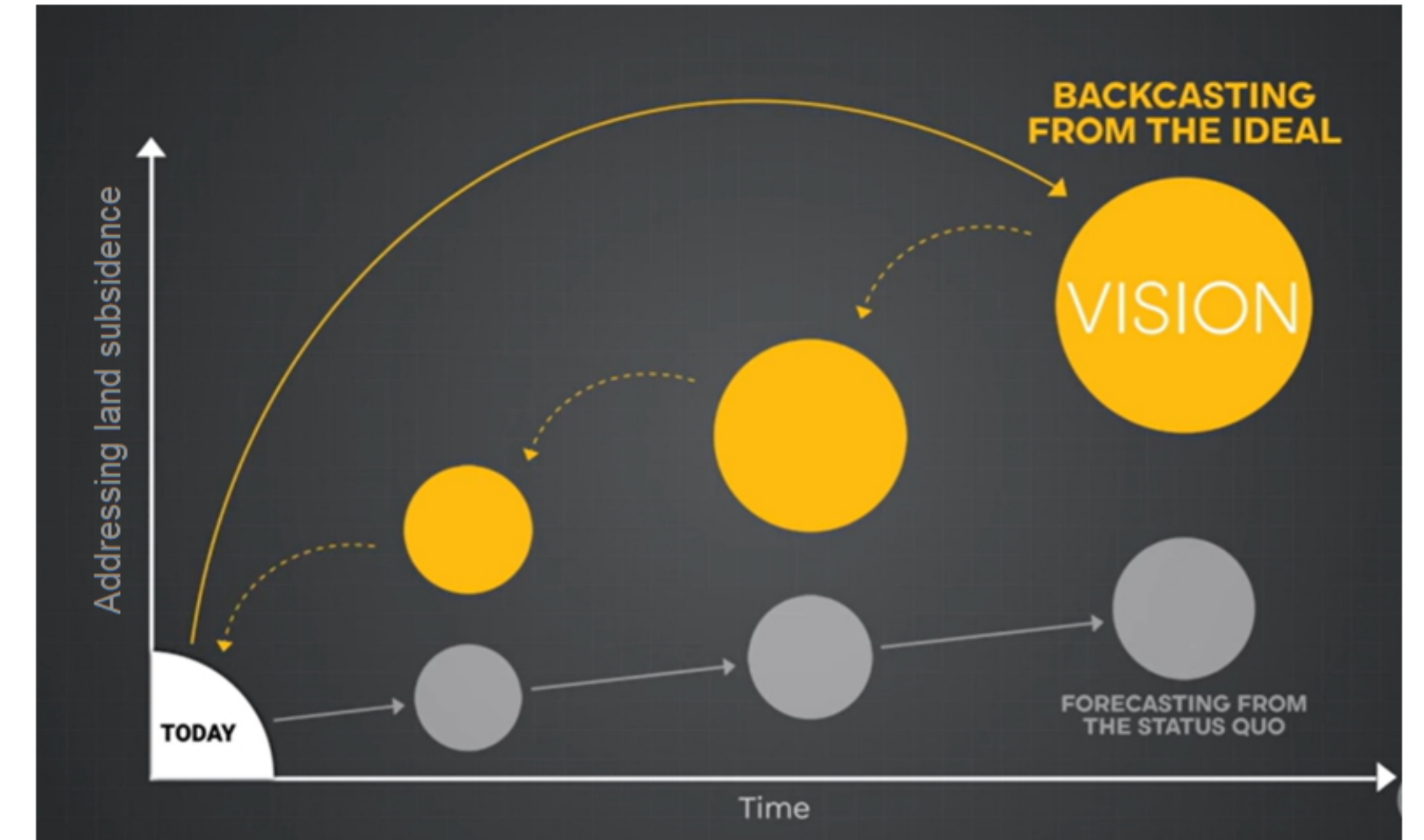


Figure 1. The backcasting approach in general (After Brandes & Brooks, 2005) [1].

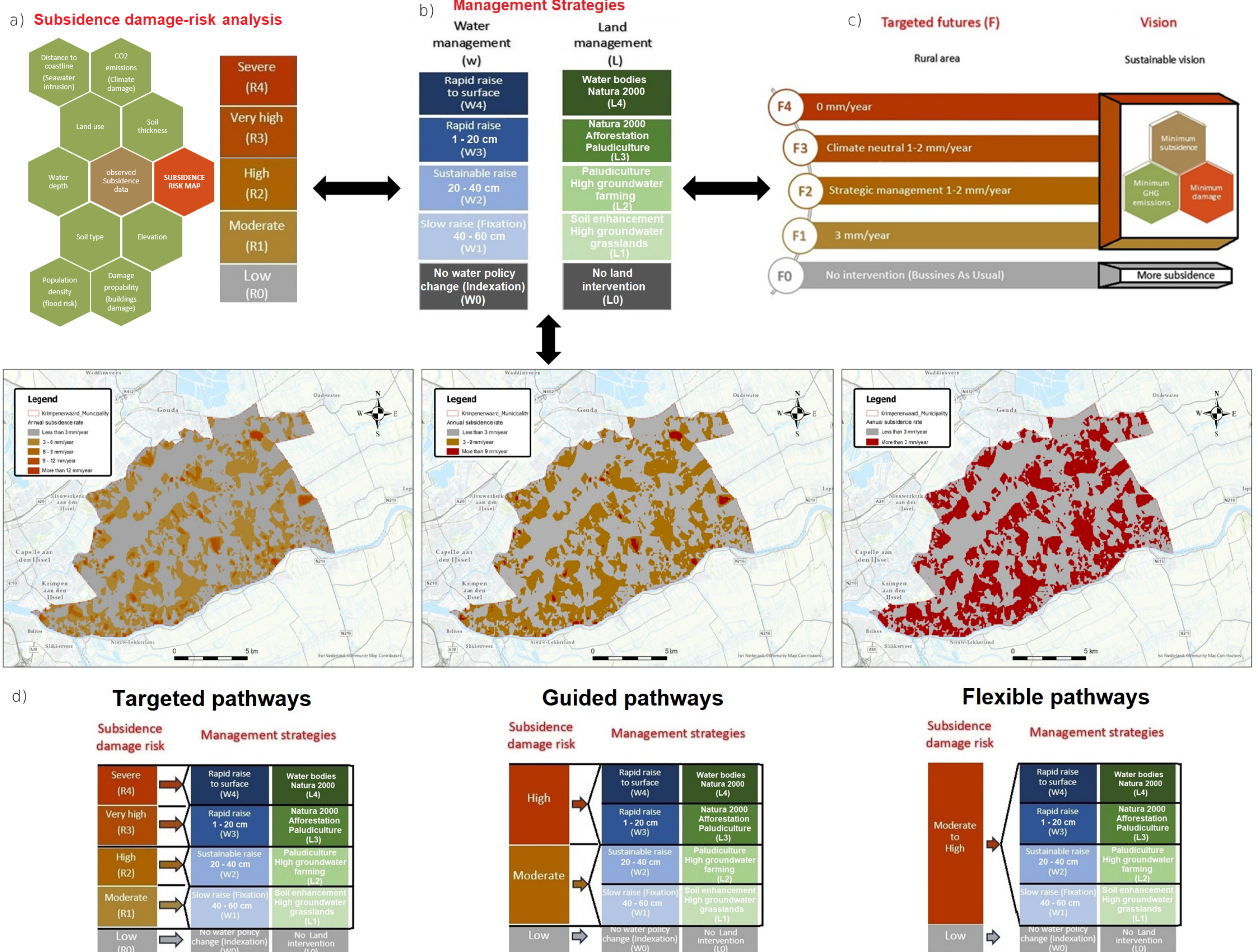


Figure 2. The backcasting approach used to develop water and land management scenarios for addressing land subsidence in the Netherlands.

Conclusion

By evaluating all strategies and scenarios through multi-criteria analysis (effectiveness and social-costs), stakeholders can select the most suitable strategies and measures for implementation in each specific area across the Netherlands to address the land subsidence effectively at local and national levels. The different scenarios of these strategies and their assessment will also help decision-makers to make informed choices regarding the proposed management pathways for sustainable addressing of land subsidence in the Netherlands.

References

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