An engine for social-ecological risk analysis and NBS recommendations for risk mitigation actions

OPERANDUM
OPEn-air laboRAtories for Nature baseD solUtions to Manage hydro-meteo risks

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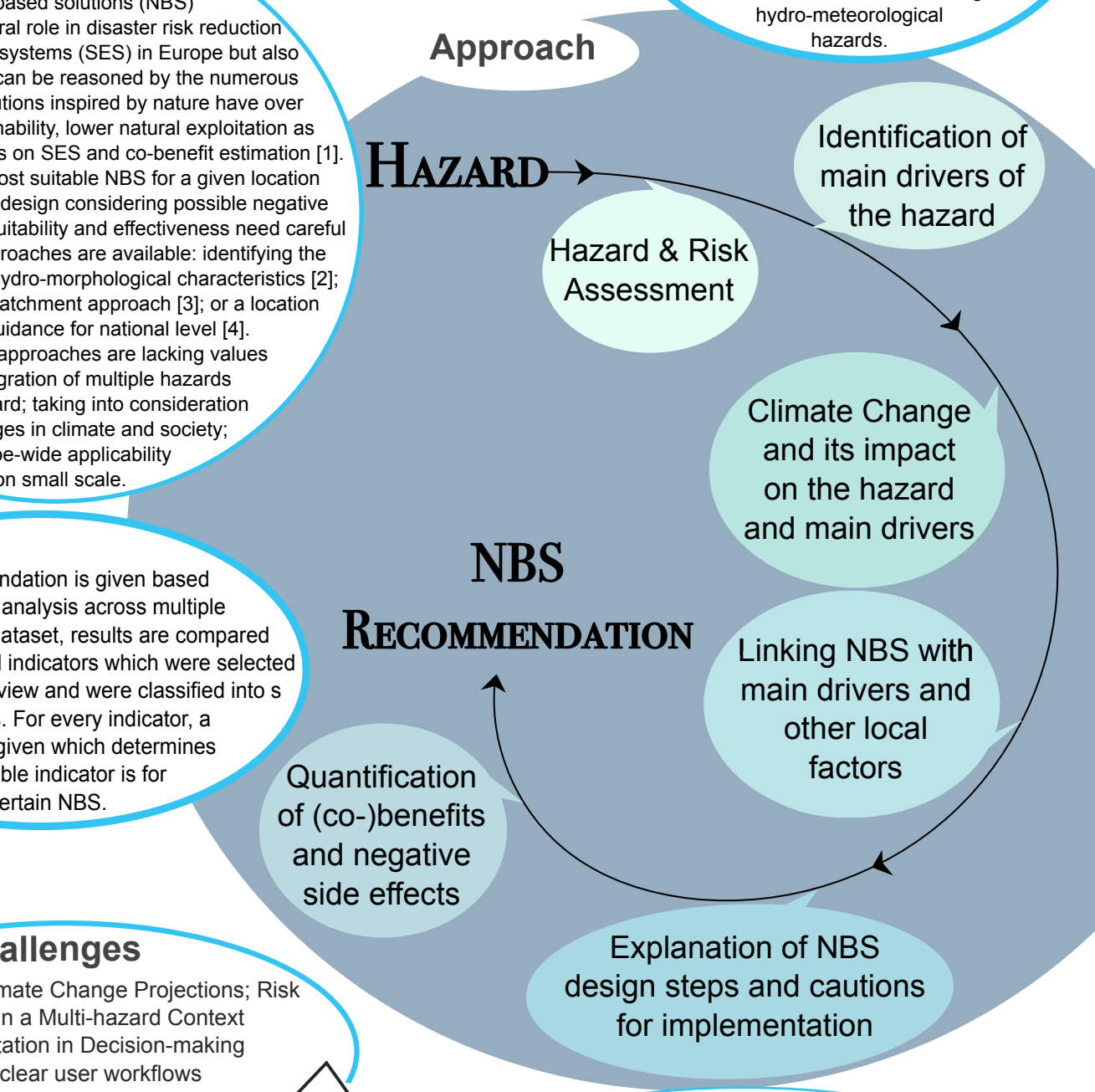
Introduction

Nature-based solutions (NBS) are gaining a central role in disaster risk reduction for socio-ecological systems (SES) in Europe but also globally. This trend can be reasoned by the numerous advantages that solutions inspired by nature have over grey solutions: sustainability, lower natural exploitation as well as a compound focus on SES and co-benefit estimation [1]. The selection of the most suitable NBS for a given location is a crucial part in NBS design considering possible negative impacts. Therefore, the suitability and effectiveness need careful examination. A few approaches are available: identifying the right location based on hydro-morphological characteristics [2]; a flood retention and catchment approach [3]; or a location assessment guidance for national level [4]. However, these approaches are lacking values such as integration of multiple hazards and multi-hazard; taking into consideration future changes in climate and society; Europe-wide applicability on small scale.

Objective

The objective is to provide an easy-to-use interactive analytical engine to support decision-making on NBS design. The engine will provide a science-based analysis of the socio-ecological factors in a selected area within Europe. Based on this and additional factors, it will recommend most suitable NBS for tackling hydro-meteorological hazards.

Approach



Methods

The recommendation is given based on a geospatial analysis across multiple datasets. For each dataset, results are compared with a set of associated indicators which were selected based on literature review and were classified into s everal classes. For every indicator, a percentage is given which determines how suitable indicator is for a certain NBS.

Future Challenges

- Integration of: Climate Change Projections; Risk Assessment; NBS in a Multi-hazard Context
- Effective Implementation in Decision-making
- Development of clear user workflows in co-design with NBS practioners
- Strengthening end-users' engagement

Resources

[1] J. Sahani et al., "Hydro-meteorological risk assessment methods and management by nature-based solutions," Sci. Total Environ., vol. 696, p. 133936, Dec. 2019.
[2] P. Guerrero, D. Haase, and C. Albert, "Locating Spatial Opportunities for Nature-Based Solutions: A River Landscape Application," Water, vol. 10, no. 12, p. 1869, Dec. 2018.
[3] DGENV, "Natural Water Retention Measures," 2014.
[4] United Nations Development Programme, "Pathway for Increasing Nature-based Solutions in NDCs: A Seven-Step Approach for Enhancing Nationally Determined Contributions through Nature-based Solutions," New York, NY, 2019.

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