



## Mapping NBS stakeholders' perspective over Sludge Treatment Reed Bed (STRB) in Iceland

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Nature-Based Solutions (NBSs) like Sludge Treatment Reed Beds (STRBs) can address resource recovery from sewage sludge in urban and rural areas to boost circular economy and to mitigate climate change. To ensure successful implementation of STRBs, an evaluation of stakeholders' perceptions can be helpful to identify relevant barriers and opportunities. In this study, semi-structured interviews were conducted with relevant stakeholders, which were categorized in 5 interest groups including academics, state and governments, NGOs, water companies and local communities across Iceland. The interviews were then transcribed and effective elements influencing STRB technology in Iceland were identified through an open-coded method on the transcriptions. The elements were categorized as independent elements (NBS actors, on-going projects, feasibility, legal, economic, sociological, and natural criteria), which were grouped into 7 classifications impacting dependent elements (relevant aspects of STRB, STRB services and system cost). Through Causal Diagrams (CDs), the impact of the independent elements was visualized on the dependent elements. The result of the study is exposed in 8 causal networks and 4 aggregated CDs for sustainability, climate change, biodiversity and circular economy together with mediators interpreting the impacts. The complexity of multi-sequenced causalities of a heterogeneous nature is depicted in CDs implying by stakeholders' reports and expectations. The study exposes information on the compatible aspects, where further research is required to facilitate the use of STRB for the resource recovery of sewage sludge in Iceland. Therefore, our findings can enable decision makers with intracommunity information to identify elements impacting STRB application, in which the influence of the multiple groups of interests is regarded.

**Keywords:** Nature-Based Solutions; Sludge Treatment Reed Beds, Resource Recovery, Causal Diagram, climate change, circular economy, sustainability