Climate adaptation and urban water systems: Fostering nature-based solutions and resilient governance systems

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Introduction to AMAREX project

Research project "Adaptation of Stormwater Management to Extreme Weather Events (AMAREX)", funded by Federal Ministry of Education and Research (BMBF), Germany

Duration: Feb 2022 – Jan 2025

Project objectives:

- Investigation of different types of stormwater management concepts and blue-green infrastructure (BGI) for their effects with regard to flood, heat and drought prevention
- Development of a web platform for municipal stakeholders to serve as an information, communication, and decision-making tool
- Development of a method and tool for socio-economic assessment of local stormwater management concepts
- Work with selected pilot areas and stakeholders in Berlin and Cologne

Research objectives and approach for socio-economic assessment

- How can an integrated socio-economic assessment methodology for blue-green infrastructure support the selection of measures in municipal planning practice?
- How can far-reaching additional benefits of BGI be reflected in the valuation?
- How can robust monetary valuations of BGI measures on local level be generated?

Approach:

Development of impact chains for municipal stormwater management → Multi-criteria analysis of local stormwater management options → Economic assessment of options' effects → Development of a tool for socio-economic assessment

Contact and funding

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FONA Research for sustainability
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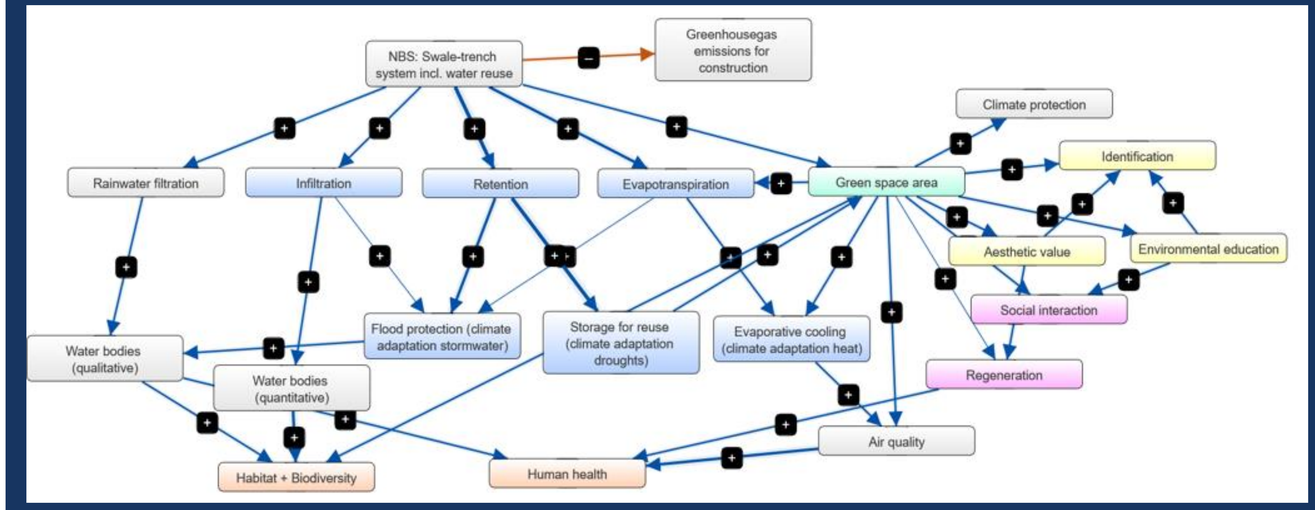
Example: Impact map for nature-based solutions related to heavy rainfall and drought

- Impact map represents impacts and benefits of stormwater management concepts and green-blue infrastructure related to heavy rainfall and droughts
- It is based on a literature screening, which resulted in more than 40 impacts of green-blue infrastructure. The impacts have been structured.
- This conceptional map will be used to further evaluate impacts as part of a semiquantitative assessment with a multi-criteria-analysis.



Possible criteria to evaluate blue-green infrastructure and nature-based solutions

- Based on literature screening of more than 40 evaluation studies and tools
- Criteria have been categorized into six categories
- A selection of criteria will be used for multi-criteria analysis

Impacts water management

- Water regulation
- Rainwater retention
- Local flood production
- Sediment retention
- Water quality

Further ecological impacts

- Climate mitigation
- Air quality
- Microclimate
- Habitat quality & biodiversity
- Pollination

Social impacts

- Urban green & recreation
- Living environment
- Scenic quality
- Health, quality of life & wellbeing
- Space for environmental education & cultural events
- Space for community activities

Economic criteria

- Efficiency
- Investment costs
- Maintenance costs
- Personnel & financial resources

Synergies / Trade-offs

- Synergies and conflicts with other policies / measures
- Cross-sectoral measures

Implementation oriented criteria

- Implementability
- Acceptance
- Flexibility re climate scenarios
- Political support
- Innovation potential
- Stakeholder participation
- Iterative process