Nature-based solutions for water smart and climate resilient cities

Science and practical implementation

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Transition Towards Water Smart Cities

- Water Supply City
- Sewered City
- Drained City
- Waterways City
- Water Cycle City
- Water Sensitive City
- Water Smart City

Ambitions

Rain water as commodity, not as nuisance!

Water supply access & security
Public health protection
Flood protection
Social amenity, environmental protection
Limits on natural resources
Intergenerational equity, resilience to climate change
Create business, economic savings, liveability, create evidence base
We have to change the way we think about water → city as catchment
Landscape based adaptation

- **River plain**
  - **Soil moisture**: Ground water profile
  - **Run-off**: Low
  - **Soil retention (summer)**: Low
  - **Action perspective**: Surface water retention, drain to river

- **Slope**
  - **Soil moisture**: Temporary ground water profile
  - **Run-off**: Medium
  - **Soil retention (summer)**: Large
  - **Action perspective**: Regulated drain to river plain

- **Hill**
  - **Soil moisture**: Capillary water profile
  - **Run-off**: High
  - **Soil retention (summer)**: Very large
  - **Action perspective**: Subsoil retention + regional retention

Infiltration + subsoil retention
Local infiltration + avoid fast run-off
Adaptation action perspective on regional level
Adaptation Planning Support Toolbox: Measurable performance information based tools for co-creation of resilient, ecosystem-based urban plans with urban designers, decision-makers and stakeholders

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Currently, most tools, guidelines and benchmarks for urban adaptation raise awareness on climate change impacts, assess the current situation and/or address the need for adaptation on a policy-level. However, tools that have the potential to design solutions in the actual urban planning and design practice seem to be missing. This paper presents the Adaptation Planning Support Toolbox (APST) to fill this gap. This toolbox supports urban designers, designers and practitioners in defining the program of demands, in setting adaptive urban design goals, and in designing urban adaptation measures with informed decision-making in urban planning and design processes. The APST provides a set of tools and guidelines to explore and design workshops, to feed dialogues among stakeholders on where and how to place the integration of adaptation measures. Applications of the AST in various settings and contexts on different continents have illustrated the added value of the toolbox in bringing policy and practice together with help of science. With more and more cities worldwide that will make the step from policymaking to actual adaptation-inclusive urban (re)development practice we foresee a growing demand for such tools.

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More than 60 nature-based solutions for climate change adaptation

- Extensive green roof
- Intensive green roof
- Green roof with delayed drainage
- Green wall
- Constructed wetland
- Bioretention pit for trees
- Enhancing soil infiltration
- Porous pavement
- Infiltration units
- Water roof
- Subsoil water storage
- Rain barrel
- Water square
- Fountain
- Wetting pavement

Bron: Adaptation Support Tool
Hoog Catharijn - Utrecht

- Green roofs with green roofs
- Green shiers and urban forests
- Increase area of water squares
- Adding trees in streets
- Extra intensive green areas
- Porous pavement
- Urban agriculture
- Extensive green areas
- Rainwater tanks
Recommendations

Water Smart
see water as commodity, be water-sensitive

Landscape-based adaptation
benefit from the underground of your location

Adaptation Support Tool
use the right Nature-based Solution for the right task
create stakeholder support for climate-proof design

Thanks for your attention!
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