

Assignment:

Adaptation Support Tool

Client:

Climate KIC – Blue Green Dream

Period:

2013-2014

A wide variety of adaptation measures is available to make urban areas more resilient to extreme weather conditions. In order to prevent or reduce damage and nuisance measures can be taken to strengthen the drainage and flood protection system, to change the land level and/or soil properties, land level, soil properties, to adapt infrastructure and buildings and to improve the people's preparedness. Over 200 structural and non-structural adaptation measures were identified. These measures can be implemented in new urban areas, and many can also be retrofitted in existing urban areas. It is however hard to select an appropriate and effective set of adaptation measures for a specific site.

Blue-green adaptation measures are often preferred over grey interventions because of their multi-functionality and the ecosystem services they provide. Their applicability and effectiveness however depends on the local conditions. A package of measures is often requires to avoid or reduce damage

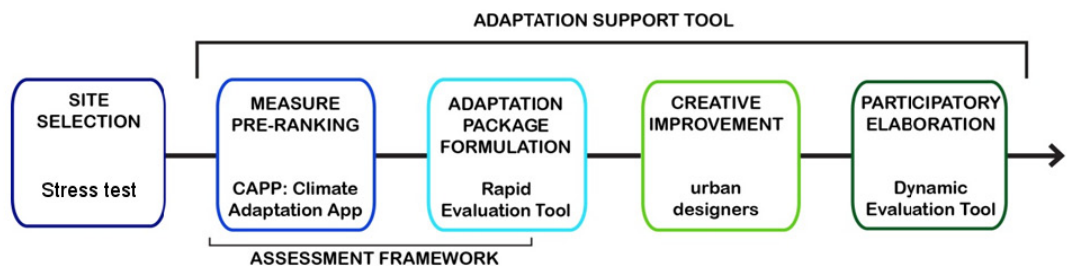
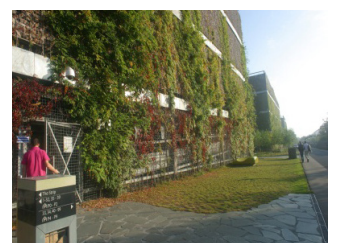


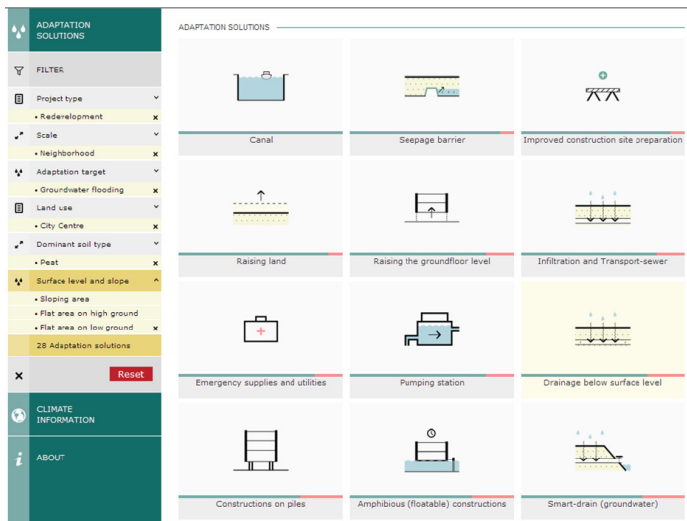
Photo: I. Voskamp



from flooding (pluvial, fluvial, coastal and/or groundwater flooding), from drought and related land subsidence and from heat stress. Adaptation measures can interfere with each other, both in positive and negative sense. That is why urban designers and stakeholders need quantified insight in the effectiveness of a package, to be able to compare alternative designs.

Designs for new-build urban areas and for reconstruction of existing urban areas are the product of a co-creative process of urban planner and stakeholders. The group of urban planners include for example building architects, landscape architects and planning economists. Stakeholders include project developers, municipal town planners, water managers, emergency services representatives, NGO's and others. Co-creating a plan is an iterative process, meant to analyse the problem, propose alternatives and narrow down their number in a controlled negotiation process.

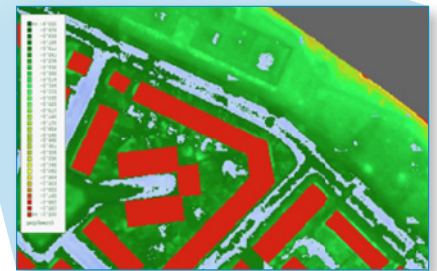
An Adaptation Support Tool (AST) was developed to assist urban designers and stakeholders in selecting an excellent package of adaptation measures that performs as required. This tool assists the users in selecting measures and checking their performance on water-, drought and heat resilience. The tool uses a stepwise approach. First the long list of structural adaptation measures is ranked with a Climate Adaptation App. This app, available on smartphone, tablet and PC, ranks the measures on their score;



Climate Adaptation App (CAPP) to pre-select suitable adaptation measures



Adaptation Support Tool on electronic design table; integrating design and engineering.



this score is based on local conditions and adaptation objectives. The CAPP is meant not to forget attractive adaptation measures at the start of the design and selection process.

A rapid evaluation tool supports the formulation of attractive adaptation packages. The tool produces key performance indicators on flood protection, groundwater recharge, droughts resilience, heat stress reduction, water quality impacts, costs and benefits on a dashboard. If the tool is combined with a design table these indicators are calculated immediately after every design modification.

This co-creative design effort results in two or three alternatives that require further elaboration, first by creative improvement and then in a more detailed design, taking dynamic effects into account. This includes surface runoff during extreme rainfall conditions – using 3Di hydraulic modelling – groundwater levels and water balance dynamics under extreme weather conditions. Costs and benefits of these detailed alternatives are made comparable so that final decisions can be made on the adaptation plan.

More information: bgs-info@deltares.nl