



Project

Theme 4 | Green infrastructure for climate-proof cities

Description of research

Climate projections indicate that heat waves in the Netherlands are likely to become more frequent in the next decades. As in other moderate climates the consequences are especially felt in urban areas because of the Urban Heat Island effect (UHI). Prognosticated large expansion of the urban landscape and urban densification within existing cities could worsen the situation. Altogether, these developments may lead to significantly higher temperatures in the urban environment which may have consequences for human health and thermal comfort.

International studies confirm the ability of urban green to mitigate urban heat and improve thermal comfort, especially by providing shade, evapotranspiration and reducing ground heat storage. From the different scale levels on which green affects the urban microclimate, especially the cooling effect of parks at neighbourhood level is indicated. But still, very little scientifically based design principles are available for urban planners how to optimally design urban green to improve thermal comfort and this way physically adapt urban areas to the shifting thermal circumstances.

Therefore, this research aims at examining and defining design principles to improve thermal comfort at different scale levels by climate-responsive usage of urban green in the (re-) design of existing and new urban areas. The design principles will be built up by scientific knowledge on the objective and perceived impact of urban green on thermal comfort. The influence of urban green on thermal comfort under Dutch summer climate conditions will be determined for different green elements at the scale levels of city, neighbourhood and street.



Research question

The main objective of this research is to examine and define climate-responsive design principles for urban green at various scale levels (city, neighbourhood, street) in order to improve thermal comfort during hot summer periods.

The most important conclusions

There are no conclusions yet; see for an up-date of the research the following paragraph.

Up-date of the research

The first extensive data collection campaigns have just been finished:

- In Rotterdam, Arnhem en Utrecht interviews were held with inhabitants to get insight into their perception and usage of green urban areas, such as parks, on warm summer days.
- In Utrecht and Rotterdam microclimate measurements with cargo bicycles were conducted on city level to get insight into thermal variance between the city centre and the rural surrounding, between the different neighbourhoods and between different parks.
- In Utrecht microclimate measurements with cargo bicycles, Assmann-psychrometer etc. were conducted on street level to get insight into thermal variance between three types of streets with different amount of greenery. Additional, interviews were held within the same streets to get insight into inhabitants perception of the present green street elements on warm summer days.

Kennis voor Klimaat Knowledge for Climate



Possible applications from the project

Design guidelines of urban green at the scale levels of

- city (e.g. location and distribution of large green areas within cities)
- neighbourhood (e.g. design of parks and transitions into adjacent neighbourhoods),
- street (e.g. design of thermal comfortable street canyons)



Bottlenecks of the project

- Complexity of various parameters which affect urban microclimate
- Sufficient micrometeorological observations to be able to generalize results and generate design principles



Opportunities for the project

- Once design guidelines for urban green are established, they will be implemented in site-designs for a couple of locations with CPC municipalities (planned in 2013/14).

More information

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