

6.48 Urban Heat Island (UHI) incidence

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Urban Heat Island (UHI) effect	Climate Resilience Natural and Climate Hazards
Description and justification	The UHI effect is caused by the absorption of sunlight by (stony) materials, reduced evaporation and the emission of heat caused by human activities. The UHI effect is greatest after sunset and reported to reach up to 9°C in some cities, e.g., Rotterdam (Van Hove et al., 2015). Because of the UHI effect, citizens living in urban areas experience more heat stress than those living in the countryside.
Definition	Urban Heat Island (UHI) effect (°C)
Strengths and weaknesses	<ul style="list-style-type: none"> + Fairly easy and straightforward assessment of temperature differences - Requires a rather large amount of temperature measurement stations to holistically identify the effect within the urban area
Measurement procedure and tool	<ol style="list-style-type: none"> 1. Identify or install one or more meteorological (temperature) measurement stations within the built environment, and one measurement station outside the city that functions as a reference station. 2. Compare the hourly average air temperature measurements of the urban measurement station(s) with the station outside the city (the reference station). 3. Look for the largest temperature difference (hourly average) between urban and countryside areas during the summer months. This temperature difference is an absolute measure of the UHI effect.
Scale of measurement	Building/plot to regional scale
Data source	
Required data	Hourly temperature measurements
Data input type	Quantitative

Data collection frequency	Annually; at minimum before and after NBS implementation
Level of expertise required	Low
Synergies with other indicators	Assessed from <i>Mean or peak daytime temperature</i> indicator and connected with <i>Heatwave Risk</i> indicator
Connection with SDGs	SDG 3 Good health and well-being, SDG 11 Sustainable cities and communities, SDG 13 Climate action
Opportunities for participatory data collection	No opportunities identified
Additional information	
References	<p>Van Hove, L.W.A., Jacobs, C.M.J., Heusinkveld, B.G., Elbers, J.A., van Driel, B.L., & Holtslag, A.A.M. (2015). Temporal and spatial variability of urban heat island and thermal comfort within the Rotterdam agglomeration. <i>Building and Environment</i>, 83, 91-103.</p> <p>United States Environmental Protection Agency. (2006). Excessive Heat Events Guidebook. Retrieved from https://www.epa.gov/sites/production/files/2016-03/documents/eheguide_final.pdf</p>

6.49 Effective drought index

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Effective Drought Index	Natural and Climate Hazards
Description and justification	Indicators of Drought Risk Resilience sub-criterion will assess the site response to drought phenomena based on susceptibility indicators: land use cover, temperature, moisture, wet weather.
Definition	Byun & Wilhite (1999) developed the Effective Drought Index (EDI), which is an intensive measure that considers daily water accumulation with a weighting function for time passage.