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2.10. Urban Heat Island Effect

2.10.1. 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 denotes an urban area that is significantly warmer than its rural or undeveloped surrounding areas. Expressed and evaluated as temperature (°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 - May require modelling expertise

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. Alternatively, models can be used. 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	City 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	Participatory data collection is feasible through geographically referenced direct temperature measurements if these are not automated.
Additional information	
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