

Indicator: Air cooling (°C)

Naturvation challenges: Climate action for adaptation resilience and mitigation; Regeneration, land-use and urban development; Health and well-being

SDGs: 3, 9, 13

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Indicator description

The air cooling indicator measures the lowering of air temperature by a nature-based solution. Green and blue infrastructure can cool the air by providing shade and by evapotranspiration, the process by which water is transferred from the land to the atmosphere by evaporation from the soil and other surfaces (e.g. 1). Cooling the air can be a climate action for adaptation to a warmer climate, as well as mitigate the negative effects of the urban heat island effect. In a warmer climate, air-cooling can become important for health and well-being, especially in an urban environment that is generally warmer than its surrounding areas (2). Some urban environments may need to be regenerated to adapt to a warmer climate or urban heat islands, thus air-cooling may be an important aspect of urban regeneration & development.

Air temperature is easy to measure using a thermometer, also many predictive models for air temperature have been developed, making it possible to simulate how air temperature is affected by the urban matrix. Cooling by green and blue infrastructure has two measurable effects: (A) lowering of temperature and (B) the temperature cooling distance. To measure these effects air cooling, temperatures under, next to, and at a distance to a nature-based solution are compared.

Generally, cooling distances are 100 to 150 m from tree patches (3), while large parks could cool up to 440 meters (4) at night-time. Blue areas cooled longer distances between 350 and 1,500 meters e.g. (5). Research on types of green and their mitigation potential for cooling urban environments has been reviewed (7). In addition, a more refined scoring methodology is available in (6). The score assesses the effectiveness of cooling capabilities of different urban green infrastructures as a function of climate zone, size of area and tree coverage.

Indicator scoring

The values used for air cooling scoring are based on three meta-analyses (8-10), modelling results of six studies (3, 11-15) and empirical data of six studies (16-21). Scores were derived by normalizing the values between 0 and the maximum value onto the scale 1 to 5.

Scores, air cooling (°C)		
Nature-based solution	Score	Mean value (min – max)
Parks and (semi)natural urban green areas	2	0.94 (95% CI of mean = 0.71–1.16)
Urban green areas connected to grey infrastructure	3	1.6 (0.43 – 3.06)
Blue areas	5	3.1 (1.6 – 5.2)
External building greens	2	1.1 (0.03 – 3.0)
Allotments and community gardens	No score	No values found
Green areas for water management	No score	No values found





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