Indicator: Carbon storage (kg carbon/m²)

Indicator description

Carbon (C) storage is an indicator for the amount of carbon in water, soil and biomass and is a part of the natural cycle of atmospheric CO_2. As carbon storage helps with the resilience and mitigation of climate change, carbon storage is linked to the Naturvation challenge climate action for adaptation, resilience and mitigation. Carbon storage is also linked to environmental quality – including air quality and waste management of fossil fuels.

Carbon storage is often given in kg/m^2 or Mg/ha and is a quantitative value, which can be estimated with several methods. Models often combine land use data with above and below ground carbon storage data to calculate total carbon storage. It can also be measured empirically through field and laboratory analysis of soil and biomass of vegetation. GIS and remote sensing such as LIDAR and satellite images can be used to estimate land use, and, for example, tree biomass as above ground carbon storage (1-2).

The capacity of an area to store carbon depends on factors such as land use and the size of the area. Carbon storage is typically higher in areas with vegetation compared to sealed surfaces (3). The vegetation is essential for above ground carbon storage (4), and the carbon content is higher in trees than in shrubs and grasses (5). Thus, urban forests and tree-rich parks can be of importance for carbon storage (6).

Indicator scoring

Values used for scoring carbon storage were based on 1 meta-analysis (3), modelling results of 2 studies (5, 7), empirical data of 1 study (8) and 1 study with a mix of empirical and modelling methods (9). To determine the carbon storage for each Naturvation domain, the cover (%) of 3 vegetation categories (trees, bush/high shrub and grass) were assessed for each nature-based solution using literature (7, 10). The total carbon storage in a domain represents the soil carbon plus the carbon stored within each vegetation category (proportion depending on cover) (5, 9). The nature-based solutions were based on the total carbon stored in a typical 1m^2 domain area. Scores were derived by normalizing the values between 0 and the maximum value onto the scale 1 to 5.

Scores, carbon storage (kg carbon/m^2)		
Nature-based solution	**Score**	**Value**
Parks and (semi)natural urban green areas	5	32.6
Urban green areas connected to grey infrastructure	4	28.9
Blue areas	5	36.1
External building greens	2	5.4
Allotments and community gardens	4	23.7
Green areas for water management	2	12.5

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