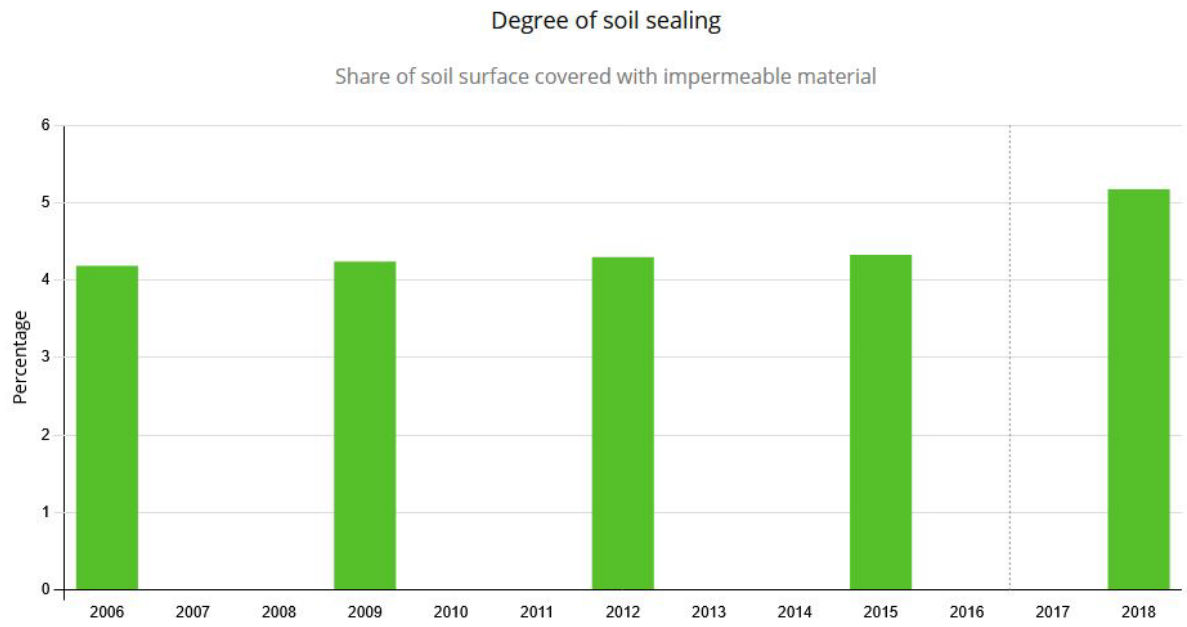
Soil degradation – *Preserving soils and their ecosystem services*

15.3 Degree of soil sealing



Note(s):
The data is based on a special evaluation and is not publicly accessible. – Since the 2018 reporting year, data has been available in higher resolution, meaning that soil sealing from 2018 onwards is depicted in greater spatial detail and more realistically. This means that comparability with previous years is only possible to a limited extent (break in time series).

Data source(s):
European Copernicus Programme, Federal Statistical Office

Definition
The degree of soil sealing represents the coverage of the soil surface with impermeable material (in %) due to urban development and infrastructure expansion. The indicator is calculated using earth observation data.

Intention
Soil is an important natural resource. Sealing it is one of the most serious forms of soil degradation. Sealed soils have a negative impact on biodiversity, carbon storage, the hydrological properties of the soil, ecosystem services and resource protection. Reducing soil degradation is an elementary component of sustainable soil management.

Target
Declining increase in soil sealing

Content and progress
Artificial sealing of soil surfaces leads to an impairment of natural soil functions. In addition to effects on biodiversity, the microclimate, and soil fauna, sealed surfaces prevent rainfall from infiltrating the ground, which can contribute to a lowering of the groundwater table on the one hand and overload drainage systems during heavy rainfall events on the other. A surface is considered sealed if it is built over, concreted, asphalted,

paved, or otherwise permanently impermeable to water. Sealed surfaces are mainly found in residential areas, on traffic areas, as well as in industrial and commercial zones. Sealed parts of areas such as allotment gardens, cemeteries, sports and recreational areas, or campsites are also included.

Unsealed surfaces include, among others, construction sites (provided there is no visible building), mines, quarries, peat extraction sites, sand pits, as well as natural, artificial, and cultivated vegetated areas, un-vegetated or sparsely vegetated areas, agriculturally used fields and arable land, vineyards, orchards, and all types of lawns used for sports, as well as forests. Additionally, glacier, snow, and water surfaces are classified as unsealed.

The indicator is calculated based on data from the European Copernicus programme. Satellite data are automatically analysed to produce the dataset, with the proportion of sealed surface determined for each analysed grid cell and then averaged for the whole of Germany. The dataset is based solely on information derived from remote sensing of the Earth's surface. Information from cadastral records or similar sources is not included. This approach may lead to inaccuracies, as sealed surfaces may not be identified as such, for example, if they lie beneath a closed canopy. A reverse effect occurs with photovoltaic ground-mounted installations (solar parks), which are recorded as sealed surfaces, although they are generally built on unsealed ground. Railway ballast areas cannot be clearly classified methodically. Within urban areas, these surfaces cannot be reliably distinguished from other infrastructure areas using remote sensing data and are therefore assigned to sealed surfaces, whereas outside urban areas they are considered unsealed.

The indicator solely reflects the proportion of sealed surfaces. It does not take into account the extent to which the unsealed surface exhibits the desired properties regarding water permeability. Thus, naturally almost impermeable surfaces such as rock, clay, and loam soils are counted as unsealed. This also applies to agricultural areas that may be heavily compacted at least temporarily due to intensive machinery traffic.

In 2006 and 2009, the sealing rate was 4.2% of Germany's total area and rose only marginally to 4.3% by 2015. In 2018, the sealing rate was 5.2%. However, this increase results less from an actual rise. Rather, from 2018 onwards, the evaluation is based on significantly higher-resolution satellite images, allowing soil sealing to be recorded in a spatially more detailed and realistic manner. Particularly on settlement areas, soil sealing not only has a considerable impact on the supply potential but also on the direct demand for various ecosystem services, such as local cooling.

Therefore, the Federal Statistical Office calculates soil sealing separately for settlement areas and transport infrastructure areas (Ecosystem Division A01 of the ecosystem land accounts). In 2018, the soil sealing rate for these areas was 42.5%. Due to the considerably higher spatial resolution of satellite data from 2018 onwards, interpretation over time compared to previous results is not meaningful. Therefore, the politically set goal to reduce the increase in soil sealing cannot yet be assessed.

Type of target
Directional target

Assessment
The increase in the degree of soil sealing should be reduced.

An assessment of indicator 15.3 is not possible. Too few data points.