

## Land use

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### Abstract

The use of land provides a key link between human activity and natural environment. The increasing demand for living space, especially in urban areas as well as an increase of economic activity and transport strongly affects land and soil.

Following SuPerBuildings' top down approach used for the further development of building sustainability assessment indicators, land use is strongly linked to the "environment" subject of concern and more specifically to natural resources, ecosystems, biodiversity and climatic systems. By means of an impact chain approach, the multifaceted environmental impacts on land and soil have been analyzed and described, focusing on their interactions over a buildings's value chain (e.g. change of land use → soil sealing → destruction of habitats → loss of biodiversity). The concept of impact chains led to the selection of two indicators for assessing land use on building level: soil sealing and change of land use.

As the most intense form of land take, soil sealing occurs when non-developed land is built on and by thus covered by non permeable or low permeable layers. Soil sealing is an irreversible process. Change of land use refers to land use changes from natural, rural and agricultural purposes to urban uses and is strongly linked to population growth, urbanization as well as urban sprawl.

Whereas the validity and importance of the land use indicators with regard to sustainable development has been explained accurately, opportunities for improvement have been detected in the field of comparability. Although land use is dealt with on local or community level, the same indicators and assessment methods should be used in order to allow for a European wide comparability of assessment results and by thus strengthen the role of sustainability assessment within planning and steering processes.

Land use related impacts on social and environmental level, ranging from urban heat island effects to groundwater decline or erosion, are also strongly linked to other increasing threats like climate change. In light of those challenges the significance of the land use issue will even increase in future and by thus require a deeper consideration within building processes.



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## Land use

### Validity

- Issue of concern: Environment (natural resources, ecosystems, biodiversity, climatic systems)
- Environmental impacts – endpoint level
  - Loss of greenfield areas
  - Wildlife and plants damage
  - Habitats loss (fragmentation & isolation; disruption of corridors)
  - Biodiversity loss
  - Soil quality loss (landslides, contamination)
  - Natural resources loss (groundwater, organic matter,...)
- Impact chain approach
  - Description of impacts over buildings' value chain




3



## Introduction

### Land Use

- Land use in Europe
  - 4% of the total area of Europe is covered by artificial areas (housing, recreation etc.)
  - 30% of the total area of Europe is moderately high or very high fragmented
- Key link between human activity and natural environment
- Drivers of land use related environmental change
  - Increasing demand for living space (urbanisation, urban sprawl)
  - Increasing economic activity and transport




2



## Land use

### Indicator “Soil Sealing”

- Soil: Top layer of the earth’s crust
- Soil sealing from buildings’ perspective
  - Covering earth with non permeable or low permeable layers
  - Most intensive form of land take, irreversible process

### Indicator “Change of Land Use”

- Type of land used for buildings
- Change of land use from buildings’ perspective
  - Changes in land use from natural, rural and agricultural purposes to built-up areas




4



## Land use

### Assessment method (design phase)

- **Soil sealing**
  - Quantitative assessment of the ratio of specific areas
- **Change of land use**
  - Qualitative assessment of the type of land used

### Applicability

- **Share of sealed soil – area related data**
  - Building layouts and plans, building information models
- **Type of land used**
  - Land development plans, zoning maps



5

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## Discussion / conclusions

- **Life cycle assessment of land use related impacts**
  - Extraction of raw materials, production of energy (biomass) etc.
- **Population growth and urbanisation**
  - Urban sprawl vs. high-density urban development
- **Increasing significance of soil sealing and land use change**
  - Climate change (heat island effect, risks of floods etc.)
- **Role of urban planning**
  - Needs and choices for different stakeholder groups
- **New building strategies for mitigation and adaption**
  - Mitigation of land use related environmental impacts
  - Adaption to effects caused by environmental impacts



7

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## Land use

### Comparability

- **Land use is dealt with on local or community level**
  - Different indicators and benchmarks
  - Different assessment / calculation methods (reference areas, terminologies)
- **European wide comparability requires**
  - Use of the same indicators
  - Use of the same assessment / calculation method
- **Definition of appropriate benchmarks**
  - Considering geographical, topographical, demographical, biological differences of the countries



6

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## Thank you for attention

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