

# Recommendations for more effective control of soil sealing in urban areas

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## Executive summary

Safeguarding soil as a natural resource has gained increasing importance within European policies and guidelines. This is reflected in the progressively stricter control of soil sealing across most Member States, especially in urban areas. The high levels of soil sealing observed in mainland Portugal's cities in 2021 appear to result from inefficient control of this process, a lack of alignment between national policies and European directives and targets, as well as limited awareness of these guidelines among national spatial planning actors. Furthermore, recent legislative changes that simplify the reclassification of rural land into urban areas have weakened the protection of this resource. To enhance national planning policies and practices aimed at reducing soil sealing, the UnSealingCities project consulted various stakeholders to evaluate recommendations devised by its team and to collect additional proposals. Some of the suggestions related to guidelines and regulations are outlined below.

## Recommendations

- The introduction of a soil-permeability coefficient into the Municipal Property Tax (IMI), applied to undeveloped areas of urban properties (such as yards), allowing a reduction in the tax payable (national level).
- The prioritisation of land use conversion between already sealed areas (e.g. industrial/logistical spaces converted to residential) (municipal level).
- The definition of standards for sustainable urban drainage, including local water management, infiltration and rainwater retention before connection to the public network (municipal level).

## Policy brief recipients

National, regional, and municipal policymakers, including the Ministry of Economy and Territorial Cohesion, the Ministry of the Environment, and public administration bodies responsible for spatial planning within their jurisdiction, as well as the Regional Coordination and Development Commissions and Municipal Councils.

## Urban soil sealing in the European Union and Portugal

Soil sealing involves covering the soil surface with impermeable materials, such as cement and tar, which reduces the provision of ecosystem services that this resource provides in its healthy state [1,2]. This process is driven by urbanisation, particularly by construction

and infrastructure development, and is therefore more frequent in urban areas. Soil sealing is currently considered one of the main causes of soil degradation in European cities [3]. The availability of permeable soil in cities is vital for ensuring their environmental

sustainability and the quality of life of their inhabitants [4,5].

Decoville & Feltgen [4] found that the proportion of impermeable soil in the artificial areas of the 100 largest cities in Europe ranged from 31.5% to 72.6% in 2018, reflecting highly diverse territorial contexts. Based on a study that demonstrated declines in urban biodiversity at soil sealing levels above 40% [6], these researchers argue that urban land take reduction interventions should be adapted to each territory, considering the existing level of soil sealing, as well as demographic, economic and environmental aspects.

The assessment of the proportion of artificial areas (in 2023) covered by impervious surfaces in 2021 by municipality in mainland Portugal identified six municipalities (Valongo, Lisbon, Entroncamento, Matosinhos, Odivelas and Amadora), where urban areas (represented by artificial areas) had soil sealing levels above 74% in 2021. Among those mentioned, the

situation was most critical in Amadora (81%), Odivelas (80%) and Matosinhos (76%).

While the planning practices recently adopted by several European countries promote increasingly tight control of urbanisation and soil sealing to meet the European No Net Land Take by 2050 target (hereinafter referred to as NNLT) and the EU Soil Protection Strategy for 2030 [7,8], and in some cases encourage the preservation of the unsealed urban areas or even their expansion [9,10], in Portugal there has been a setback in the protection of soil as a natural resource, driven by the recent facilitation of the construction of public housing, logistics and industrial hubs and the establishment of dry ports on rural land [11]. It is therefore urgent to raise awareness among national spatial planning stakeholders of the need for tighter control of urban soil sealing and for the implementation of nature-based solutions that enhance the resilience of cities to climate change.

## Analysis

The development of recommendations aimed at strengthening national planning policies and practices to mitigate urban soil sealing was based, in the first phase, on the consultation of European and national strategic documents, a review of specialised literature, and the documentation of good practices on sustainable urban development implemented in different territorial contexts [12].

Subsequently, through an online questionnaire designed for this purpose, the opinions of a group of national spatial planning stakeholders (academics, researchers, decision-makers and technicians from different levels of public administration) were collected regarding each recommendation and the levels of governance (national, regional and municipal) at which it should be addressed. The questionnaire also allowed respondents to justify their disagreement with specific recommendations, suggest alternatives to those presented, and identify legal instruments that needed to be reformulated to ensure greater soil protection.

Figure 1 presents the professional activity of the 87 respondents to the online questionnaire. More than half are employed in public

administration, with the largest share working at the municipal level (33%). Researchers and academics account for nearly one quarter of the sample (24%), slightly exceeding the proportion of participants from the central government (23%). Notably, only 1% of respondents reported working in regional government.

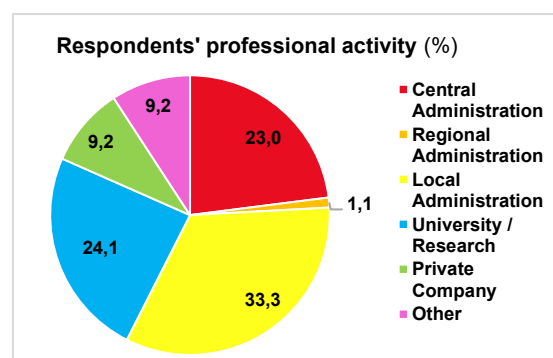


Figure 1 – Professional activity of respondents to the questionnaire on recommendations for controlling soil sealing in urban areas.

From the initial set of recommendations evaluated by stakeholders [13], only those that achieved a level of agreement of 90% or higher were selected, along with the supplementary recommendations deemed most relevant and frequently mentioned by respondents. The 25

proposals identified through this process were organised into six areas of intervention: Awareness raising and capacity building, Collaborative governance, Guidelines and regulation, Financial incentives, Leadership by example, and Monitoring. The area with the most recommendations (15) is Guidelines and

regulations, ten of which are solely targeted at the municipal level of government, the level most directly involved in developing and implementing spatial planning instruments and responsible for defining the land use regime within their territories.

## Policy Options and Recommendations

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The housing crisis, particularly the shortage of affordable housing, is not exclusive to Portugal. It affects many other European countries and threatens the achievement of the NNLT target and the associated land-use guidelines [14]. In addition, the transition towards a circular and carbon-neutral economy, as well as the reintegration of production areas within European territory, has increased the demand for space for the establishment of storage and logistics centres in strategic locations close to consumption areas, as well as for areas dedicated to energy production and storage and the creation of new economic activity zones. These trends pose additional challenges to attaining the NNLT target [15].

During the Belgian Presidency of the European Union, proposals were put forward to reconcile these competing objectives, namely the anticipated increase in land consumption for housing and economic activities and the achievement of the above-mentioned target.

Concerning housing, the need for stronger integration of spatial planning, housing, environmental and fiscal/tax policies was highlighted, as well as the promotion of medium-sized cities to reduce regional disparities. In operational terms, three instruments were proposed [14]:

- Community Land Trusts (CLTs) - a model focused on ensuring long-term housing affordability and sustainability. In this model, the CLT retains ownership of the land, while residents own or rent the buildings constructed on it. This separation between land ownership and building ownership helps keep housing costs low and prevents speculation.
- The use of surface rights to ensure the provision of housing at controlled costs.
- Inclusive zoning - which requires urban development projects with a significant

building area, located in central urban areas, to allocate a percentage of their construction area to affordable housing, thereby promoting social cohesion.

Regarding the reintegration of production areas within European territory ("green reindustrialisation"), three types of practices have been identified [15]:

- Prioritising land use in accordance with the hierarchy set out in the EU Soil Protection Strategy, including the reuse of contaminated sites, the conversion of abandoned industrial areas, and the promotion of vertical densification and functional mix.
- Strategic planning based on smart specialisation approaches, rooted in existing local capabilities, opportunities, and needs, aimed at aligning economic activities with appropriate territories and at fostering territorial cohesion.
- Forecasting the demand for space dedicated to economic and industrial activities, energy production and storage, and the circular economy, while also anticipating job creation and future energy requirements.

The following section presents the recommendations gathered to improve the effectiveness of national planning policies and practices in mitigating soil sealing in cities, as well as identifying the levels of governance to which they are directed.

### Awareness raising and capacity building:

- The dissemination of European soil guidelines among national land-use planning stakeholders (national level).
- Capacity building for the implementation of soil-related directives or regulations (national level).

- The promotion of inter-municipal cooperation and the exchange of good soil management practices between regions and municipalities (municipal and regional levels).

#### Collaborative governance:

- The involvement of citizens in urban planning and the promotion of informed public debate (municipal level).

#### Guidelines and regulation:

- Regulatory simplification, avoiding the proliferation of laws that are not suited to local contexts (national level).
- A more active role for the Public Prosecutor's Office in analysing municipal regulations (national level).
- The introduction of a soil-permeability coefficient into the Municipal Property Tax (IMI), applied to undeveloped areas of urban properties (such as yards), allowing a reduction in the tax payable (national level).
- The inclusion of principles and rules in the regulations of plans or programmes that reflect the planning and management measures or recommendations resulting from their Strategic Environmental Assessment (all levels of government).
- The establishment of quantitative regional and municipal targets to limit soil sealing in territorial planning programmes and plans (all levels of government).
- Improved coordination between local urban plans and practices (municipal level).
- Curbing the sealing of natural and semi-natural areas through land-use regulation at the municipal level (municipal level).
- The prioritisation of land use conversion between already sealed areas (e.g. industrial/logistical spaces converted to residential) (municipal level).
- Strengthening monitoring, supervision and the imposition of fines to ensure compliance with legal instruments and the effective implementation of the measures set out therein, particularly in the execution of construction works, and concerning the parameters for the design of green spaces (municipal level).

- The inclusion of policies, measures, principles and rules that increase environmental efficiency in spatial plans (e.g. increased carbon sequestration by soil, ecosystem restoration, energy production from renewable sources, reduction of energy consumption and CO<sub>2</sub> emissions) (municipal level).
- The definition of standards for sustainable urban drainage, including local water management, infiltration and rainwater retention before connection to the public network (municipal level).
- The promotion of sustainable rainwater management, changing the paradigm from rapid drainage to 'retain, infiltrate and reuse', including the implementation of measures for rainwater retention and storage in buildings and public or private spaces (municipal level).
- The re-naturalisation of rivers by removing piping, freeing up banks and floodplains to protect the safety of people and property (municipal level).
- Planning for the reconversion of infrastructure that will become obsolete, such as thermal power stations (municipal level).
- The reorganisation of parking and mobility through the adoption of alternative models, such as the creation of car parks and 'Superilles / Superblocks', and the decision to make underground parking mandatory in collective buildings, as well as the encouragement of car sharing and soft mobility (municipal level).

#### Leadership by example:

- The prioritisation of soil de-sealing in public spaces (municipal level).
- The use of permeable paving materials in the renovation of public spaces (municipal level).

#### Financial incentives:

- The provision of support for projects that promote urban sustainability, such as the POLIS programme (national and regional management with municipal implementation).

- Promoting the implementation of sustainable urban drainage systems (SUDS) and other innovative water management systems in urban areas through targeted financial incentives (national and regional management with municipal implementation).

#### Monitoring:

- The evaluation of the environmental and social impacts of soil sealing (all levels of governance, with local consideration in decisions regarding changes in land use).

- The identification and mapping of intra-urban areas with potential for soil de-sealing interventions (municipal level).

To better align European soil guidelines and targets with the growing demand for this resource—driven by the housing crisis and the expansion of economic activities—it is recommended, in addition to implementing the proposals outlined above, that the instruments and measures presented at the beginning of this section be applied where appropriate and adapted to national circumstances.

## Conclusion

The lack of effectiveness in controlling soil sealing in urban areas by land management instruments and national guidance documents, as well as their misalignment with European policies and guidelines, has contributed to the scarcity of permeable soil in Portuguese cities and the consequent increase in their vulnerability to climate change. In addition to

raising awareness of this issue among spatial planning stakeholders, this document presents proposals targeting at the land management system that seek to curb, or even reverse, the current rate of land take, including that enabled by recent legislative changes to Portugal's land-use planning framework.

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