

Trees in the ground or in pots: between theory and practice in Poland and Ukraine

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Abstract. Rules for planting trees in historical areas and associated challenges have been considered. We analysed policy documents and opinions of officials responsible for managing greenery. With exceptions, trees are planted in both private and public spaces in the considered cities, while potted specimens are found in public spaces. Local policy documents refer to improving urban living conditions without specific operational directives on cultural, environmental, social and technical conditions for new plantings. Officials have identified technical problems such as a lack of biologically active spaces, difficulties in locating new trees due to existing underground infrastructure, and the lack of space for large pots due to the narrowness of streets. Urban greenery in Polish cities is managed by a variety of agencies, which is a significant inconvenience. Lviv in Ukraine is the only studied city with a cohesive program and centralized management under one department.

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1. Introduction

Historically shaped downtowns with medieval origins in Central Europe, such as Poznań, Lublin, and Lviv, are distinguished by the compactness of buildings and a large share of sealed surfaces. From the early stages of medieval European cities' development, buildings were tightly located along regularly arranged streets (Lück, 2014). Iconographic sources show that trees were present in courtyards of buildings and within monastery properties (Fijałkowski & Kseniak, 1982; Lerue, 2015). Changes came in the 18th century and later with the development of industry and the progress of social and natural sciences, and increased awareness of hygiene and esthetics. The demand for greenery was increasing; its importance was increasingly understood and appreciated, especially in areas with poor sanitary conditions. This stimulated the planting of new trees in cities (Kubus, 2007). After losing their defensive importance, medieval fortifications were dismantled; the liquidated embankments and moats were covered with trees, and parks, gardens, promenades and boulevards were established. Trees and shrubs were introduced into the squares and market squares, mainly around the town hall, as well as into the Old Town areas (although most streets remained without trees) (Kubus, 2004). The next stage was the restoration of cities after World War II, which included rehabilitating the urban structure, including buildings and technical infrastructure, and the greening of the entire city. Tree-lined squares were created on the market squares as a continuation of the implementation of interwar ideas (Habuda & Radecki, 2015). In recent decades, this process has been reversing. In the name of modernization, massive, drastic tree felling was carried out and, for example, urban markets were paved. Similarly with the greenery along streets modernized and expanded in the 1960s and 1970s, in place of the trees planted before the war we now have new road lanes or parking spaces. Consequently, empty, paved squares have emerged, which city officials claim reference the city's medieval history (Szczepanek & Trzaskowska, 2019). This has led to dissatisfaction among residents, who do not wish to spend time on a sunny, greenery-free square, leading to the placement of benches, tables and trees planted in large pots (Przesmycka, 2017).

Modern research proves the importance of trees in cities. They play a crucial role by providing ecosystem services that directly and indirectly

improve human well-being (Pataki et al., 2021), increase transpiration and shading, mitigate the urban heat island effect (Grimm et al., 2008) and reduce the costs of maintaining urban infrastructure (Conway & Urbani, 2007). The ecological function related to providing habitats for various organisms must be added (MacGregor-Fors et al., 2011). Research findings indicate that social, health and climatic functions are significant, even for Small-Scale Urban Nature Parks (Baur & Tynon, 2010). Urban trees and green spaces can improve stability and familiarity, as well as convey the idea of cleaner and healthier environments (Henwood & Pidgeon, 2001). They may stimulate mental restoration, contributing to health and well-being (Gehl, 2010). Despite the great importance of the benefits provided by greenery in cities, its role in urban planning and management has only been growing in recent decades (Pauleit et al., 2019). However, some city-dwellers have negative opinions about the advisability of introducing trees. There are indications of the nuisance caused by bird droppings, insects that are more common among trees, shading of apartments, and allergies to tree pollen (Battaglia et al., 2014). There are the questions of whether and, if so, how to introduce greenery into the spatial structure of historical parts of cities, and where to provide high-quality space for residents and tourists. At the same time, establishing modern functions is a growing challenge (Bruce & Creighton, 2008).

The aim of our study is to specify the patterns in the spatial distribution of trees in durable pots and to understand what motivates decision-makers as to the placement of trees in medieval parts of cities.

The research focused on three medium-sized cities in Central and Eastern Europe: Poznań and Lublin in Poland and Lviv in Ukraine. They have similar climatic conditions, location within the same continental biogeographical region, and shared historical context. These commonalities allow for a valid comparison of the tree policies and their impact on the distribution of trees in the historic city centers. This study builds upon a previous tree inventory in the three cities (Mizgajski et al., 2023).

A comprehensive understanding of green infrastructure within medieval parts of cities, including the position of trees, is crucial for enhancing residents' quality of life, preserving the heritage of historic districts, and maintaining their tourist appeal.

2. Scope and methods

The research focused on identifying the distribution of trees in large pots left outside for winter. This involved conducting a survey among local administration representatives and analyzing relevant local policy documents. Fieldwork took place within the former medieval city walls during the growing season of 2021 and was updated in 2023. Surveys and the analysis of local policy documents were completed simultaneously. We identified the locations of trees in streets, squares, courtyards and unmanaged greenery. In addition, the different types of land ownership were taken into account based on cadaster data (*Portal Systemu Informacji Przestrzennej Miasta Poznania*, 2023; *System Informacji Przestrzennej Lublina*, 2023; *Kadastrava karta Ukrainy*, 2023).

To identify the causes of differences between the tree policy in the studied cities, we conducted a questionnaire study among representatives of local administration responsible for decisions regarding trees in historical areas. We asked eight open-ended questions to gather detailed opinions. Specifically, we inquired about their views on: planting both large and small trees; which historical period should be referred to when carrying out revitalization, particularly in relation to decisions about tree planting in cities of medieval origin that were destroyed during World War II; the reasons for not planting trees in the medieval districts; the importance of residents' arguments for introducing greenery, including trees, into the downtown areas; and the extent to which current climate changes should influence the introduction of greenery, including trees, into the medieval part of the city. In Poznań, four questionnaires were completed by representatives of the Municipal Roads Authority (*Zarząd Dróg Miejskich - ZDM Poznań*), the City Hall - Department of Environmental Protection (*Wydział Ochrony i Kształtowania Środowiska - WKiOŚ Poznań*), the City Hall - Office for Projects Coordination and Revitalization (*Biuro Koordynacji Projektów i Rewitalizacji - BKPiRM Poznań*) and the Municipal Conservator of Historical Monuments (*Miejski Konserwator Zabytków - MKZ Poznań*). In Lublin, the survey included three municipal units: the Municipal Greenery Architect (*Miejski Architekt Zieleni - MAZ Lublin*), the Municipal Conservator of Historical Monuments (*Miejski Konserwator Zabytków - MKZ Lublin*) and the Municipal Road Authority (*Zarząd Dróg Miejskich - ZDM Lublin*). In Lviv, where the management of urban greenery is concentrated in one office, the responder was

the Department of Ecology and Natural Resources Management Town Planning Department of the Lviv City Council (WZE Lviv).

We reviewed local policy documents to assess the strategic approach to greenery in the city, particularly focusing on trees. This includes guidelines for protecting and shaping green areas, revitalization programs, and climate change adaptation plans. Although the documents vary in detail and address greenery issues in fragmented ways, they allow for a comparison of the framework for greenery management in the cities considered.

Poznań has guidelines for the design, protection, and maintenance of street greenery (*Wytyczne do projektowania, ochrony oraz pielęgnacji zieleni przyulicznej*, 2019), and Lviv has a strategic document (*Lvivska miska rada*, 2018; *Plan dii staloho...*, 2022), which also includes the upgrading of the public space. In contrast, Lublin does not have relevant official documents; instead, we analyzed the standards of protection and maintenance of greenery based on documentation related to tenders for such works and the standards for small architecture in the Old Town (*Lubelska Księga Standardów*, 2018). Both Poznań and Lublin have a revitalization program (*Gminny program rewitalizacji dla miasta Poznania*, 2017; *Program Rewitalizacji dla Lublina na lata 2017-2023*, 2017) aimed at economic, social and cultural revival, which prioritized the improvement of public spaces. The analyzed climate change adaptation plans for Poznań and Lublin follow a similar structure and have been adopted as official papers (*Plan Adaptacji do zmian klimatu Miasta Poznania do roku 2030*, 2019; *Plan Adaptacji do zmian klimatu Miasta Lublin do roku 2030*, 2019). In Lviv, the official document on adaptation to climate change was adopted in 2022 (*Sustainable Energy and Climate Action Plan for Lviv City Territorial Community 2030 (in Ukrainian)*) (2022). The previously used document, an independent expert statement, did not have binding force.

3. Results

3.1. Distribution of trees in the ground and trees placed in large, durable pots

In Poznań, trees were introduced in noteworthy numbers: 68 trees were planted in the ground, and 19 were placed in large, permanent pots (Fig. 1). The trees in the ground were planted half by squares

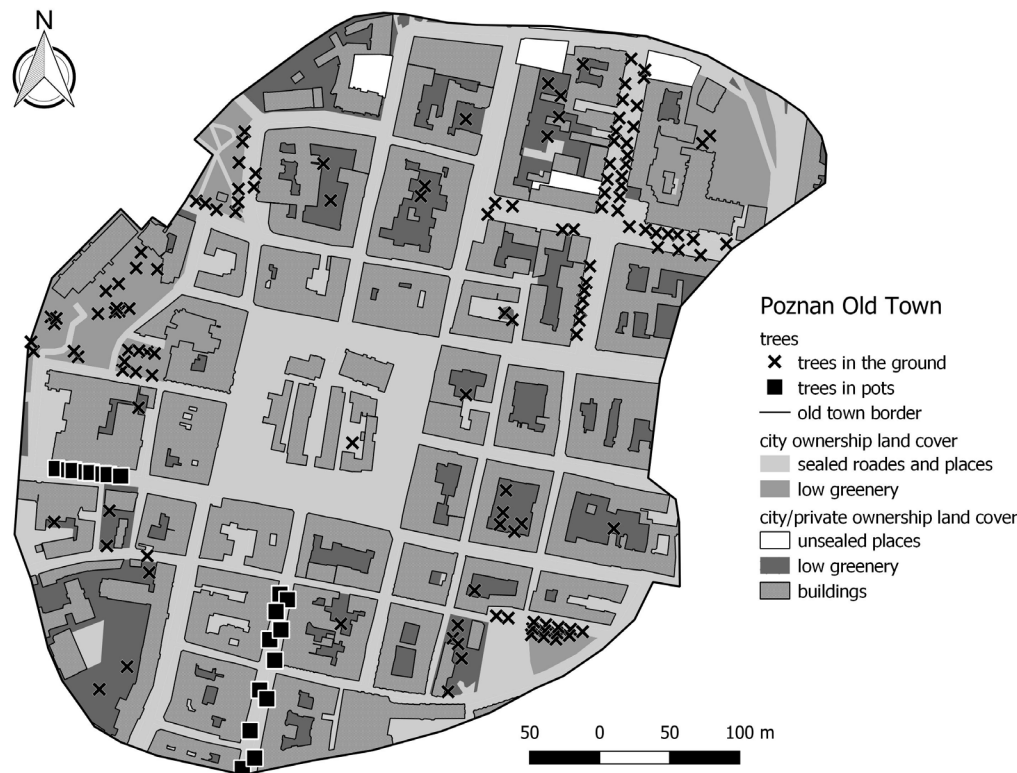


Table 1. Number of trees in the ground and in pots in the medieval area of Poznan, Lublin, Lviv

City	Research area, hectare	Number of trees in the ground per hectare	Trees in the ground			Number of trees in the ground and in pots per hectare	Trees in the pot		
			All	Public	Private		All	Public	Private
Poznań	22	5,8	128	97	31	0,9	19	19	0
Lublin	7	12,1	85	51	34	2,6	18	18	0
Lviv	17,9	11,2	201	201	0	2,9	52	52	0

Source:

and half by streets. A mere two specimens were placed in courtyards. In Poznań, the courtyards of tenement houses are divided into many small plots, some of which belong to private owners and some to the city. In private areas, 31 trees were planted in the ground; there are no trees in pots in these areas (Table 1).

Plantings in the ground were concentrated along streets (about 40 trees) and on the square

(14). Over a dozen specimens were introduced in various places as supplementary plantings. On streets, *Acer platanoides* 'Globosum' dominates, with 24 specimens, whereas, on the square, *Platanus xacerifolia* with regular crowns predominate. Two species of *Tilia* sp. (11) and *Cerasus* sp. (8) were planted in pots. They are located along a street previously crowded with parked cars, which

is presently a pedestrian zone with numerous restaurant gardens.

Within the medieval area of Lublin, in recent decades, plantings have been introduced diffusely (Fig. 2). Eighty-five specimens were planted in the ground, which, considering the area of this part of the city, means a similar intensity as in Poznań. The predominant species are *Robinia pseudoaccacia* 'Umbraculifera' (8 trees) and *Acer platanoides* 'Globosum' (4). Distinctive for Lublin is the lack of street trees planted; meanwhile, new trees dominate in yards (11) and squares (9). Eighteen trees were placed in pots – proportionally much more than Poznań. They are predominantly located along the main pedestrian route and within Town Hall Square. *Salix caprea Pendula* (6) predominates among the seven species placed in the pots. In Lublin, some buildings and small areas nearby belong to private owners, most of them to the city. In the ground, there are 51 trees on city-owned land and 34 on private land. All potted trees are in urban areas (Table 1).

The most significant scale of tree plantings, both in the ground (201) and in pots (52), was in Lviv (Fig. 3). The supplementary planting of trees in the ground was carried out mainly in squares and

squares (168), to a lesser extent in streets (49), and the least in courtyards (21). A significant number of these were young trees replacing dying old trees of the same species. Most pots (38) are placed along street pedestrian routes, and a smaller number (14) are in squares. In Lviv, some buildings and small areas nearby belong to private owners, though most belong to the city. All trees planted in the ground and pots are located on land owned by the town. The species composition is very diverse, as it comprises nearly 30 species and varieties, predominant among which are *Tilia cordata* (48), planted mainly in Old Town squares, and *Thuja occidentalis* (43) in church squares. *Acer platanoides* (25) was primarily grown in the squares, *Fraxinus excelsior* (18) in the streets, and *Salix alba* (10) mainly in yards. *Aesculus hippocastanum* (13) replaces older, dying specimens of the same species, and *Crataegus monogyna* (12), which reaches a smaller size, is planted as companion plants to larger trees.

Most of the potted trees are *Acer platanoides* 'Globosum' (20), *Robinia pseudoaccacia* 'Umbraculifera' (10), *Acer platanoides* 'Drummondii' (8) and *Tilia cordata* (6). The pots are placed mainly along pedestrian zones.



Fig. 2. Spatial distribution of trees in the medieval area of Lublin
Source:



Fig. 3. Spatial distribution of trees in the medieval area of Lviv

Source:

The comparison of tree plantings in the medieval areas shows differences in tree policy among the examined cities; by far the most significant number of trees was planted in Lviv – mainly in squares and a significant number in streets. Proportionally, in Poznań and Lublin a similar number of trees was planted. However, the spatial distribution in the two cities differs. In Poznań, plantings are similar in number in streets and squares alike; by contrast, in Lublin, there are no plantings in streets, but they are similar in number in courtyards and in squares alike. Trees in pots can be found in Poznań only along pedestrian zones. Such a location also prevails in the other two cities, but a significant proportion of trees in pots in Lviv is located in streets and, in Lublin, on squares. None of the cities has trees in large pots planted on private land (Fig. 4).

3.2. Tree policy in local strategic documents

Analysis of local policy documents shows that they are similar in indicating the need to restore trees, introduce new greenery and protect existing greenery. All documents ascribe great importance

to creating even small patches of greenery, such as pocket parks and green backyards, especially in areas where greenery is lacking and UHI (Urban Heat Island) exposure is highest. However, no specific guidelines exist for historic spaces, not even in revitalization programs (Shevchenko & Vlasiuk, 2015; *Plan dii staloho enerhetychnoho rozvytku ta klimatu lvivskoi terytorialnoi hromady 2030 – in Ukrainian*, 2022). In general terms, they indicate that each activity in downtown must be based on the history and tradition of the place. The value of historic buildings should be considered and the historical heritage respected (*Gminny program rewitalizacji dla miasta Poznania*, 2017; *Program Rewitalizacji dla Lublina na lata 2017-2023*, 2017).

Local policy documents offer a wide range of possibilities for action but do not specify detailed conditions for introducing high greenery to compact buildings. Only the guidelines for Lviv recommend two varieties of beech (*Fagus sylvatica purpurea* 'Atropunicea', *Fagus sylvatica Pendula*) for backyards in the Old Town (*Lvivska miska rada*, 2018). For Lublin, there is an indication that the tree species composition needs to be recreated by eliminating non-robust species. In the case of flower

pots, the preferred species are low-growing, adapted to urban spaces, drought-resistant, safe for passers-by and with low pollen counts (*Lubelska Księga Standardów*, 2018). The guidelines for Poznań require that the appropriate selection of species for a particular object is applied and that unproven plants are not used. When selecting plants, the soil and climatic conditions, as well as those resulting specifically from the urban conditions, should be taken into account, as well as the location of existing and planned underground utilities (*Wytyczne do projektowania, ochrony oraz pielęgnacji zieleni*

przyuliczne, 2019). These general formulations still need to be developed into operational directives.

The review shows that the local tree policies leave a vast scope of freedom for the institutions managing greenery in the examined cities. Such a conclusion is consistent with the fact that, despite similarities in the urban fabric, there are significant differences in the attributes of trees planted in the medieval parts of the cities under study.



Fig. 4. Trees in the ground and in pots in: (a, d) Poznań; (b, e) Lublin; (c, f) Lviv
Source: authors'

3.3. Discussion of the interview results

Structured interviews with representatives of municipal institutions dealing with tree policy and management have aimed to explain the principles of tree policy. At the level of declarations, there are no significant differences between the opinions of representatives of various institutions in the cities studied. They support planting large trees where possible “because only they can effectively provide us with good living conditions in cities” (ZDM Poznań). However, due to the frequent lack of space, and thus limitations in the possibility of their development, it is not possible to use them in every location: “The size of the tree should be adapted to the place, the way of land development in the immediate vicinity and the function it is to perform in the surroundings and for the environmental conditions” (WKIOŚ Poznań). “You should remember about their proper care (pruning)” (MAZ Lublin), and “even large trees can be shaped” (BKPiRM Poznań). The lack of space and the underground infrastructure are identified as the most substantial barriers to tree planting. “Each operator of the underground network has specific guidelines regarding the distance of its infrastructure from other networks as well as plantings” (BKPiRM Poznań), “in some cases, the reason is the location and impact of such plantings on monuments, views or reception” (KZ Poznań) or “the presence under the surface of streets, pavements, and squares, historical remnants of the former buildings (underground, dungeons)” (KZ Lublin).

As a rule, trees of native species are planted, replaced and supplemented with the same species. Historical references in species selection are not always the most appropriate because of changing climatic conditions in cities, considering the possibility of growth and the durability of trees. According to officials, smaller trees such as *Robinia pseudoaccacia* 'Umbraculifera' and *Acer platanoides* 'Globosum' are considered easier to plant but pose maintenance problems due to the low crown. “The tree is deformed by constant pruning. Renovations of the facades of tenement houses, renovation of streets contribute to mechanical damage, including to crowns” (ZDM Poznań), “They also cannot generate regulatory benefits similarly to larger trees” (BKPiRM Poznań, WKIOŚ Poznań, KZ Poznań, WZE Lviv). It was also declared, “We do not continue planting this kind of trees along the streets of Poznań” (ZDM Poznań). Officials in Poznań (WKIOŚ Poznań) and Lviv (WZE Lviv) emphasize that the sizes of trees should be adapted

to the land development in the immediate vicinity and the function they can perform. Attention (MAZ Lublin) was drawn to the problems with shading the windows and the need for proper care, which entails considerable costs and may impact the planting choices. BKPiRM Poznań and KZ Lublin indicate that extensive public consultations accompany each investment. KZ Poznań and KZ Lublin emphasized that, only in some cases, the reason for not introducing trees is the location and impact of such plantings on monuments, views or the perceiving of a space.

In all cities, officials emphasize the need to preserve existing trees. In Lviv (WZE Lviv), it was pointed out that “some of the trees planted after World War II are at the age limit or beyond. Currently they are about 70% of the population of street trees, which is a threat in strong winds and storms.” In Lviv, the condition of trees is assessed on an ongoing basis, and if they are in poor condition, they are removed and replaced with young trees of the same species, except for poplars. In Lviv, the city authorities also run the “I want to plant a tree” campaign. Anyone can buy and plant a tree in a place designated by the authorities. The action covers the central parts of Lviv, including the medieval one. Officials agree that the ongoing climate change is an essential argument for introducing trees into medieval areas of cities. There is also agreement that the voice of the inhabitants when introducing greenery, including trees, should be a critical factor in making decisions. “Representatives of housing estate councils define their priorities and preferences in terms of introducing greenery in districts” (BKPiRM Poznań); “landscape architects or gardeners dealing with urban greenery agree with the residents regarding the introduction of high greenery, and when it comes to Poznań, each space is analyzed in terms of this angle” (ZDM Poznań). The comfort of elderly people and people with disabilities, who often do not participate in discussions, should be considered, because “the Old Town has narrow streets, trees with open crowns should be planted in front of the windows, or compact trees that do not shade but give partial shade” (WZE Lviv). MAZ Lublin pointed out the problems that arose during discussions with residents: “On the one hand, it is the desire to have a biologically active space generally in the Old Town; on the other hand, not necessarily in the immediate vicinity of the residence, because it involves, for example, the loss of a parking space at the property or cleaning leaves in the fall.”

In the opinion of the representatives of the interviewed institutions, tree planting should be

carried out according to the scheme: large trees first, then small trees and, finally, trees in pots. The selection of tree species and the location of trees should consider the expectations of contemporary inhabitants, including shading, aesthetic values and the need for contact with nature, of which there is so little in a highly urbanized urban fabric. At the same time, it is necessary to consider the possibility of the tree adapting to the challenging conditions of the urban environment and the limitations resulting from the functions of the area, underground technical infrastructure, underground parts of historical buildings and spatial conditions.

It should be borne in mind that the perception of greenery in city centers has varied over the centuries and has also changed in the last 30 years. The new approach is evidenced by the letter of the Undersecretary of State responsible for the Cultural Landscape of 23 July 2021, addressed to the provincial conservators of monuments in Poland, in which he states that the conservation protection of the historical area should not be an obstacle to introducing greenery. The argument for restoring market squares and squares to their original function created in the Middle Ages is invalid if the result is a square with a paved surface and flower pots instead of old trees.

4. Discussion & conclusions

The number of new plantings in historical spaces (in the 20th century and at the beginning of the 21st century) was not high in almost all cities of Europe and the USA, as included in the study, which shows that decision-makers do not favor increasing the amount of greenery in cities (Nowak & Greenfield, 2018). In Poland, concreting-over and tree removal in historical spaces with medieval origins were often performed as part of revitalization projects (Lewicki, 2023). Kronenberg (2015) points to the role of bureaucratic barriers in introducing trees into heavily invested-in parts of the urban fabric. Only comprehensive management from the macro to the micro scale allows for effective coordination and effectiveness of activities. When urban trees are subject to different local administration units and other entities, the management system is ineffective due to fragmentation and contradictions of competencies, the multiplicity of regulations, and a lack of clearly defined responsibility (Łukaszewicz, 2013). Our research confirms this: in Lviv, where the management of urban greenery is concentrated in one office, greenery is best preserved. A crucial

element in effectively managing urban greenery is cooperation between cities and residents through public consultations and educational activities (Baycan-Levent & Nijkamp, 2009; Biejat, 2017). The practice in the studied cities contradicts research findings that the cultural history of a given area is positively related to its green quality and, therefore, to public health (Weimann et al., 2017).

Among the trees planted in recent decades, there is a clear dominance of ornamental trees grafted on the trunks of *Acer platanoides* 'Globosum' and *Robinia pseudoaccacia* 'Umbraculifera' (Trzaskowska & Januszczyk, 2016). This solution is unfavorable, both aesthetically and architecturally; the unnatural morphology of their crowns does not correspond to the scale of development or the character of historical spaces (Przesmycka, 2017). However, research conducted in the Old Town of Lublin regarding the preferences of residents for trees indicates the acceptance of such forms, especially in pots (Trzaskowska et al., 2023). Ameen et al. (2015) point out the advantages of sustainable urban design, which harmoniously combines the protection of historical heritage with the character and spatial distribution of green areas. Planting small forms of ornamental trees has little natural and ecological significance compared to native forms (Gromke & Ruck, 2007). These new forms of tree crowns are alien to the landscape of historic parts of cities. Research documents trees' environmental benefits, including cooling effects, which depend on tree size and foliage density (Georgi & Zafiriadis, 2006). Tall trees are planted only in Lviv. Similarly, in UK cities, planting large tree species is promoted because the extensive leaf area is crucial for the benefits of trees to humans (Armour et al., 2012). The claim that the restriction on planting large trees is due to a lack of space and the existence of underground infrastructure should be criticized. There are technical solutions and compensation systems (Mullaney et al., 2015) and proven species (Sjöman et al., 2018) to overcome these difficulties.

Ottitsch and Krott (2005) highlighted the unsatisfactory implementation of existing regulations, programs and plans as one of Europe's most significant weaknesses in urban greenery policy. Bourne and Conway (2014) reached similar conclusions when they analyzed tree distribution in urban municipalities in the Greater Toronto Area. The results of this study confirm this. Local policy documents recognize the importance of trees in improving a city's climate, the aesthetics of heavily invested-in land and the quality of life of its residents, but none of the cities surveyed has a coherent tree policy that includes specific targets for trees in densely built-up areas or directives

on how to achieve the targets. Meanwhile, Bodnaruk et al. (2017) show that such documents should contain detailed guidelines that consider existing conditions and ways of adapting green infrastructure. Nowak et al. (2013) showed that such an approach requires courage from both designers and decision-makers. Cultural heritage is a potential resource ensuring the quality of human life and sustainable development. Its goals are the protection of cultural heritage, rational use of buildings, improvement of public space, promotion of culture, interaction and integration of society, and improvement of living space and conditions. There are three dimensions of environmental sustainability – economic, social and ecological – and a balance must be maintained between them (Trušinš, 2000). Although the cultural environment and landscape are perceived as essential values in planning conservation activities, the requirements of modern society determine the need for the functionality of the development of historic buildings and the city's surroundings in general. Interdisciplinary cooperation and understanding are required to preserve and develop cultural space (Ziemeļniece, 2012).

Jim (2000) points to physical constraints on urban greening: limited ground-level spaces allocated to trees; numerous cables, pipes, large pieces of concrete and rock in the topsoil due to underground installations; poor urban soil; and air and water pollution in urban centers.

Tian et al. (2012) point to social constraints on urban greening because development land is a valuable commodity, and the resulting lack of greenery prevents residents from understanding and appreciating the many functions of urban vegetation. Institutional limitations (i.e., legal, administrative and bureaucratic systems) make it difficult to improve the condition of tree cover. Disorganization and unclear division of managerial responsibilities among different departments make greening projects ineffective (Jim, 2000). The lack of related legal guarantees (e.g., coordination between the departments involved) means that managers attach little importance to this task. Moreover, cities still need long-term landscape plans describing the conceptual basis for greening and encouraging private sector input into the greening endeavor (Jim, 2000). In the search for a new quality of life in cities, it is important to find point solutions within even small spaces (Kleszcz, 2025).

The Central and Eastern European cities in this study have similar spatial structures and nat-

ural conditions. The development of high greenery mainly results from local development. The number of trees in each studied city is small, and their spatial distribution varies, as does the share of trees in the ground and in flowerpots in private and public spaces. These differences demonstrate that the local practice is the main driving force for tree distribution. Although cities have local climate policy documents and guidelines for protecting and caring for greenery, they do not contain specific goals or instructions on how to achieve them. Although managers interpret existing documents well, they need to cooperate. As a result, there are differences in the spatial structure, species and size of trees. Lviv is the city with the highest number of planted trees and is supported by a dedicated greenery management unit and a comprehensive document guiding management and planting. The results of this study indicate the need to further expand research in densely built-up cities, considering social and cultural aspects, especially regarding how trees in medieval parts of cities are perceived by residents, tourists and businesses. This is even more critical as climate change forces adaptation projects, among which nature-based solutions play a crucial role.

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