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ORIGINAL PAPER
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GREEN INFRASTRUCTURE AS UNDERSTOOD BY STAKEHOLDERS IN SMALL AND MEDIUM-SIZED TOWNS IN POLAND

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ABSTRACT

Motives: In urban governance processes involving local communities, green infrastructure (GI) is an important proxy for the local quality of life. In this paper, the authors focus on GI in small and medium-sized Polish towns, which attracts much less research interest than that in large cities. The study covered 97 towns, and it included desk research and a questionnaire survey of local authorities and NGOs.
Aim: The aim of the study was to determine whether residents are involved in the management of urban GI, whether local authorities and communities have identified the need to develop new GI, and whether they are taking appropriate measures to maintain and preserve the existing GI resources. Another objective was to examine the priority of existing GI resources in governance policies.
Results: The levels of citizen participation and GI management in small and medium-sized towns were ranked. The general observation is that green spaces are not an effective participation tool in small towns. The situation has gradually improved in medium-sized cities and towns within metropolitan regions, but this does not seem to be a determining factor.

Keywords: public greenery, participatory scale, local management, survey, interviews, ranking

INTRODUCTION

More than 30 years passed since the Soviet Union had collapsed, and despite the fact that most of Eastern Europe's former Soviet satellites have gained European Union membership, there are still many distinctions between Eastern and Western Europe. Poland, as a country of fast economic growth and rapid development of infrastructure, pretends to become the leader of Central Eastern Europe (CEE). However, a lack of active urban policy, as well as long-term negligence in spatial planning, result in an increase of spatial conflicts. As Maciejewska and Ulanicka-Raczyńska (2023, p. 1) concluded "rational spatial planning ensures fair access to a safe environment for all citizens, and it can be an instrument of environmental justice". Usually, green infrastructure (GI) becomes a victim of such conflicts. Lack of continuity in financing,

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lack of connections between strategic and planning documents, the low level of awareness about the impact of GI on human well-being result in it fragmentation an inability to create a coherent system of green areas (Janiszek & Krzysztofik, 2023; Ministerstwo Infrastruktury i Rozwoju, 2015; Węcłowicz et al., 2010).

CEE countries need to face several challenges in the field of spatial planning, including climate change (European Commission, 2013). For example, the Central European towns rate in the last third of EU cities measured through the green city index (Siemens, 2009). The low standing of these towns is due to the low wealth and the legacy of history – decades of environmental neglect during the communist period – mass housing, and heavy industry in the past. However, there is a strong correlation between city size and the index: small cities both in the Central-East European area and other EU countries perform better than larger ones (Siemens, 2009; UN-Habitat, 2013). Spa-ce.net activities have shown that CEE countries show certain resistance to the introduction of the GI concept. This might be rooted in the capacity of the spatial planning epistemic communities and certain scepticism towards everything that is "eco" or environmental (Marot et al., 2015).

The most important facts underpinning our research include a growing interest of researchers and politicians in small and medium-sized towns (Carbonaro et al., 2018; ESPON, 2006; Pinilla et al., 2008; Schlappa & Nishino, 2021; Servillo et al., 2014), the lack of understanding of GI functionality in small and medium-sized towns both in objective categories (resource assessment; comparative analysis of towns) and in the opinion of the authorities and residents, and the lack of insight into how GI is managed (the scope and effectiveness of the tools used). Although there are several studies about GI as a resource in towns (Mell, 2013; Otsuka et al., 2021; Wilker & Rusche, 2014; Wright, 2011), its role in the development of policies for public spaces in SMT is rarely highlighted (Marot et al., 2015; Pichler-Milanovič & Foški, 2015). As Morisson (2022) stated compared to metropolitan areas, small and medium-sized towns (SMT) are often less diversified, which makes path creation more difficult. SMTs are prone to more research and policy challenges than metropolitan areas, including lock-ins, lack of scientific and technological endowments, lack of innovative entrepreneurship, institutional inertia, brain drain, conformism due to high social capital, rise in populist political parties, and more.

In recent decades, the participation of local communities in management has grown significantly worldwide (Denhardt & Denhardt, 2000; Sawhney et al., 2007; Selman, 2004). "Social participation" is the term used in Polish literature to refer to the engagement of citizens in the decision-making processes (Czupich, 2018; Gawryszewska, 2016; Kaźmierczak, 2011). The turn of the 1990s brought Poland significant changes in the perception of the role of public authorities. At that time, a top-down framework based on a bureaucratic model was replaced with a new approach embodying participatory public management. As a result, in recent years, residents have gained the possibility to co-decide on local issues through social participation (Czupich, 2018). "Greenspace development in post-socialist countries has stagnated thanks to weak system regulations, political biases, and complicated property ownership following privatization, and it remains highly dependent on European aid" (Vano et al., 2021, p. 2). Being a result of bottom-up activities, so-called "urban gardening", based on existing public green areas, including the informal ones (Gawryszewska et al., 2019; Sikorski et al., 2021) is also an important factor in environmental justice (accessibility to GI; equal distribution of public green resources) (Arshad & Routray, 2018; Certoma et al., 2019; Egoz, 2017; de Sousa Silva et al., 2018). The contemporary understanding of participatory democracy with respect to public space assumes equitable access to GI (Certoma et al., 2015; Vaňo et al., 2021) and the delegation of decisions about its use and the facilities it provides (Mees et al., 2019). This is directly related to the already classic scale of participation published by Arnstein (1969) in the form of the well-known ladder, where the means and tools of public participation in planning and management

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of public space are arranged in a hierarchy from informing and consulting to delegating decisions. This hierarchical approach is contemplated in recent studies on the importance of public participation in building a sustainable community and social capital (Carpentier, 2016; Crawford et al., 2008; Gaber, 2019). All the more important seems to be officials' awareness regarding the role of citizen participation and the possibility of using its various tools to expand the quality of life through GI functions (Darvishmotevali & Altinay, 2022).

The main research questions (RQ) answered in this paper are:

RQ1: Do town authorities and their communities recognize the importance of GI and consider GI as a vital natural and social resou? Is there any difference between small and medium-sized towns?

RQ2: What is the advancement scale of public participation according to the ladder of citizens participation in the management?

RQ3: Do social, spatial, economic or local policy aspects and the level of development of a region determine this advancement scale?

RQ4: Does the perception/recognition of GI vary between small and medium-sized towns in and outside metropolitan regions?

LITERATURE REVIEW

The GI concept is understood as a natural, service-providing infrastructure, in its broadest sense, and therefore includes also the so-called "blue infrastructure" and defines vegetation and water-covered areas in cities, including architectural surfaces covered with vegetation, and rainwater retention devices (Szulczewska, 2018), and complementary to 'grey' infrastructure (Wesener et al., 2017).

Due to the current demographic situation of Poland (low fertility rate, in 2020 355 thousand live births were registered, and in 2021, the number of live births decreased, when compared to the previous year, by about 24 thousand and amounted to 332 thousand) and alarming demographic forecasts, small and medium-sized towns are at the centre of interest of researchers as being most at risk of depopulation and loss of existing functions (GUS, 2022; Hrynkiewicz & Szukalski, 2018; Runge et al., 2020). According to the current data (GUS, 2023), Poland has 979 towns, of which 762 are small (less than 20,000 residents). Poland has 180 medium-sized towns (20,000–100,000 inhabitants) and 37 large towns (more than 100,000 inhabitants). This list shows a dominant number of small towns, which constitute 78% of all the settlements having urban status. Mid-sized towns constitute 18.4%, whereas large towns – 3.6%. In the aspect of population, small and medium-sized towns are settled by 12.4 million people (10.7 million people leave in the towns with more than 100,000 habitants). Small towns – 5 million, which translates into 12.9% of Poland's total population and medium-sized towns – 7.4 million (19%). Śleszyński (2016) notices that many medium-sized towns after the 1989 transformation fell into a severe socio-economic regression associated with a loss of industrial and administrative functions. Meanwhile, these towns play a significant stabilizing role in the polycentric settlement system in Poland.

The need to study GI was also pointed out by the authors of the report adopted by the Congress of Small and Medium Towns in Wałbrzych, Poland (Wałbrzych Declaration, 2019), recommending support for small and mid-sized towns in the protection and management of forests, lakes, and rainwater. Due to their specificity, small Polish towns have been the subject of extensive research by urban planners (Adamczewska-Wejchert & Wejchert, 1986; Gzell, 1987; Mazur-Belzyt, 2020), geographers (Bański, 2022, 2023; Kobojek & Marszał, 2014; Rydz, 2007), and economists (Heffner & Marszał, 2006; Szymańska & Grzelak-Kostulska, 2005).

Urban planners paid attention to solid connections with the surrounding nature and landscape. Chmielewski et al. (2013) noted, the landscape of small and medium-sized towns is always created with natural and built elements. In many cases, natural components are the most potent means of local identity, primarily if they result from unique landforms or strong forms of vegetation cover (Bogdanowski,

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1976; Sobczyńska, 2014; Zachariasz, 2006). Green areas dynamize the city landscape and its image, create an attractive framework for social activities, build up the recognition, iconicity of the city (e.g. green areas in the town centre of Lidzbark Warmiński – Fig. 1 or the greenery along the river and around the monastery hill in Czerwinsk on the Vistula River – Fig. 2). GI is vital, yet underestimated, as evidenced by very little research on greenery in small towns. Pancewicz (2004) emphasizes that since small towns are characterized by limited areas, optimally planned GI can allow residents to have direct contact with the surrounding nature.

In small and medium-sized towns, wide access to suburban open space causes citizens to underestimate public green space in the town (Atkinson, 2017, 2019; Mayer & Knox, 2010; Shackleton, 2018). Ambrose-Oji et al. (2017) stated that bottom-up initiatives could enhance nature creation and governance in and around cities. For example, GI can adopt urban horticulture as a tool to increasing food self-sufficiency by providing vegetables and fruits to the small and medium towns population (Korkou et al., 2023; Walsh et al., 2022). GI is an integral component of sustainable communities. It can help communities protect the environment and human health while providing other social and economic benefits. Sustainable communities are places that balance their economic assets, natural resources, and social priorities so that residents' diverse needs can be met now and, in the future (Faehnle, 2014; Molin et al., 2015; Møller et al., 2019).

Fig. 1. Greenery as an element that completes the image of the Lidzbark Warmiński in its central zone: greenery on the Łyna River around the castle and greenery in the vicinity of the collegiate church, which is the gateway to the city centre with the market square
Source: own elaboration.

Fig. 2. The silhouette of the Czerwińsk from the side of the Vistula River: greenery as an element shaping the landscape frame for the buildings
Source: own elaboration.

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MATERIALS AND METHODS

Research scope

This paper focuses on Polish small and medium-sized towns (SMT) because Poland has dominated the leaderboards of fDi (foreign direct investments) Intelligence's European Cities and Regions of the Future 2023 ranking from major towns to large, mid-sized, small, and micro (European Cities and Regions of the Future, 2023).

Initial diagnosis (the selection criterion was the status of the urban commune) showed that 264 towns (148 medium and 116 small) are in our range of interest. All these towns were researched, but due to the returnability of the questionnaire, 97 of them were finally qualified for the study (38 – small towns, 59 – medium-sized towns). The towns selected for this study represent all NUTS-1 units (GUS, 2021). 25 towns are located within metropolitan regions, and 72 in other NUTS-3 regions (GUS, 2016). There are 9 towns from Northern Macroregion, 15 towns from North-Western Macroregion, 10 towns from Macroregion Mazowieckie Voivodship, 21 towns from Eastern Macroregion, 10 towns from Central Macroregion, 21 towns from Southern Macroregion, and 11 towns from South-West Macroregion (Fig. 3).

Research design

The research methodology used in this study is based on three classes of research: survey, valorisation with the authors' original score classification, and correlation study. With regard to the research questions formulated above, we developed the following research procedure (Fig. 4):

Town selection

As it was mentioned above, 97 of Polish towns were finally qualified for the study (38 – small towns, 59 – medium-sized towns).

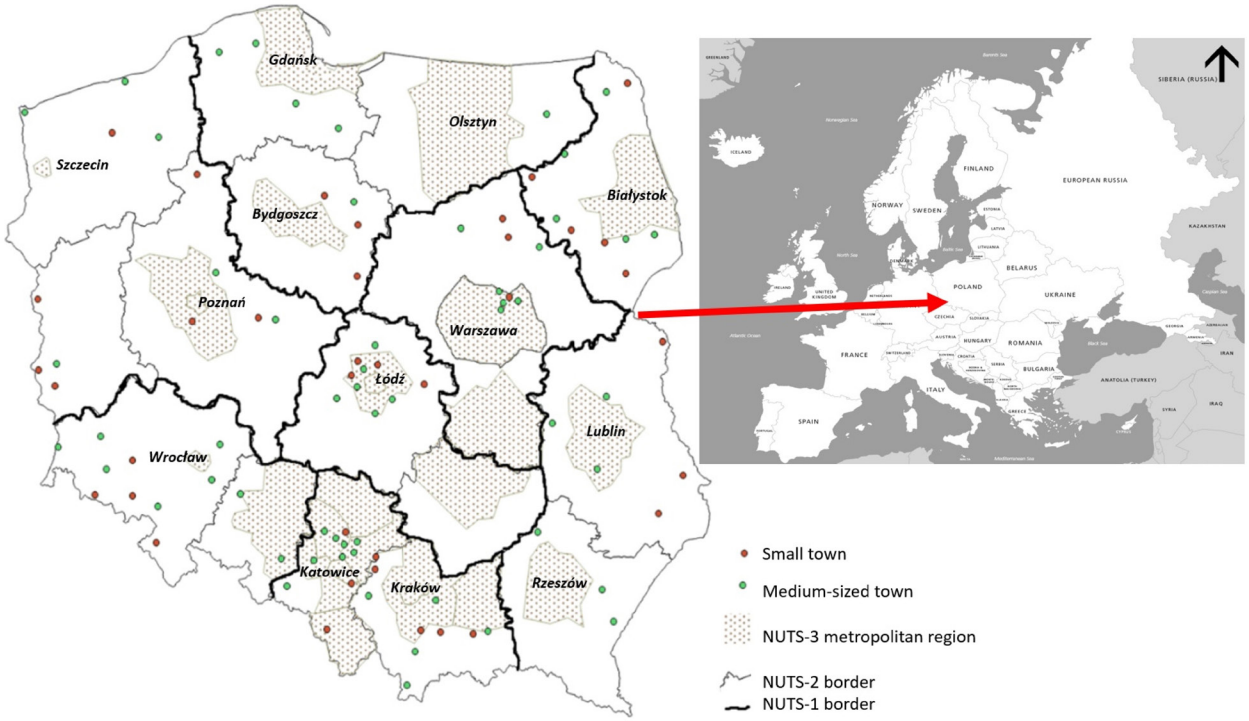

Fig. 3. Map of Poland showing the towns under analysis. Map of Europe highlighting Poland
Source: own elaboration.

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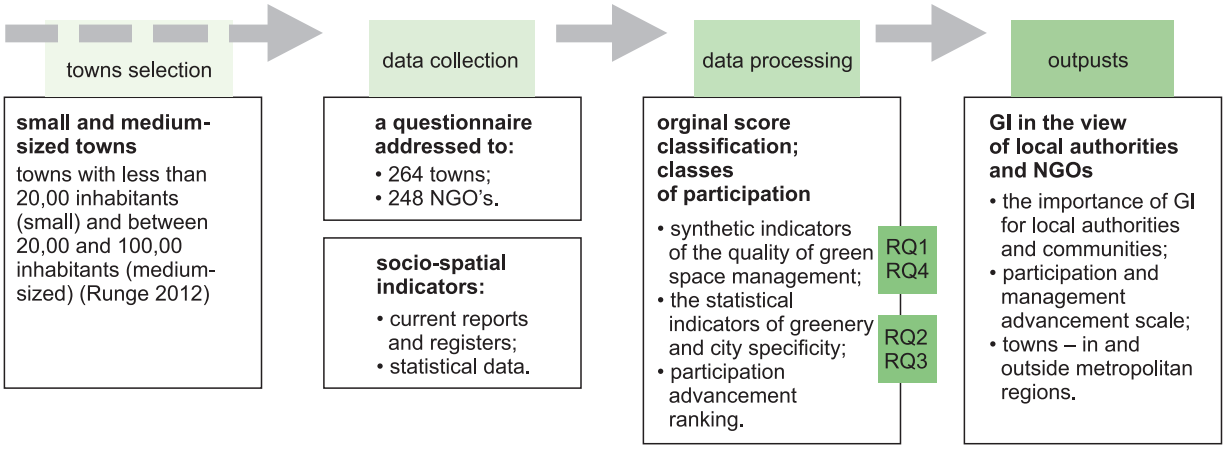

Fig. 4. Research design – schematic representation of the research procedure
Source: own elaboration.

Data collection

Data on the towns were obtained through surveys and Desk Research. The research tool was the original questionnaire that included seven questions referring to:

- the scale and tools of participation (How often does the town authority use different participation and communication methods in green space management? Do residents come up with initiatives and volunteer actions regarding GI?);
- social potential (Have any surveys been conducted regarding satisfaction with the place of residence and the perceived quality of the living environment? Have any surveys been conducted on the ways and frequency of using green areas? Have any surveys been conducted on grassroots initiatives concerning greenery management?);
- the scale and tools of town's involvement in GI (What actions supporting the development of GI have been undertaken? Has the town received funding for GI in recent years, 2014–2020, funding perspective)?

The questionnaire was developed using Google Forms tools and sent out to the official addresses of the offices of 264 towns (a request to complete the questionnaire, along with an explanation of the purpose for which the survey is being done and data is being aggregated, went to the email inboxes of the secretariats of town offices and the departments responsible for managing urban greenery). The questionnaires were distributed to the offices in October-December 2021, and 30 days were set for responses. After this time, due to a low return, a renewed request was issued. In addition, questionnaires were sent to 248 NGOs. Organizations were searched using https://spis.ngo.pl/. Where possible, the questionnaire was addressed to an organization whose statutory goals are focused on environmental protection, greenery, environmental education. The smaller number of organizations than towns was due to the fact that there are so-called Local Action Groups, whose spatial scope extends beyond one town. 97 towns completed the form. The study included those towns from which the questionnaire was returned. Desk Research collected data from current reports, statistical data and registers of these towns. In addition, data for identifying socio-spatial conditions of researched settlement units were collected from the towns' municipal offices and the Public Information Bulletin, Statistics Poland and Local Data Bank (BDL) (https://bdl.stat.gov.pl/) (Tab. 1).

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Table 1. Sources of data collection

Aspect of the study	Indicator	Data collection
Social	Population total	BDL, as at 31.12.2020
	Migration balance	BDL, as at 31.12.2020
	Quality of life index (environmental part)	Śleszyński, 2021
	NGOs Indicator NGO/1000 inhabitants	https://spis.ngo.pl/ town's municipal offices and the Public Information Bulletin
	Number of NGO's focused on greenery, ecology (total)	on the basis of statutes; search for key words in the statutes: green, environment, ecology
Spatial	Share of green areas in the town area	BDL, as at 31.12.2020
Economic	Expenditure on greenery maintenance per inhabitant	BDL, as at 31.12.2020
	Location in metropolitan NUTS-3 region	Eurostat, as at. 31.12.2022
	Municipal income per capita	BDL, as at 31.12.2020
	Expenditure on air and climate protection per capita	BDL, as at 31.12.2020
	Expenditure on water protection and wastewater management per capita	BDL, as at 31.12.2020
Survey results on local policy	Quality of participation	Survey Part 1 – total points obtained in this part (Tab. 2)
	Quality of management	Survey Part 2 – total points obtained in this part (Tab. 2)

[1] Share of parks, public green squares and residential green areas in total town area expressed in %
Source: own elaboration.

Data processing

In this phase all collected data was examined and processed in two main steps:

1) examining relationship between obtained indicators (RQ1, RQ4);
2) elaborating original score classification based on participatory ladder (RQ2, RQ3).

According to step 1) first two auxiliary synthetic indicators were calculated based on survey results using score classification method that is presented in Tab. 2. There were: quality of participation (part 1 in Tab. 2) and quality of management (part 2 in Tab. 2). They were calculated simply as a sum of points obtained in two parts of survey.

Then the correlation calculations of the following indicators were performed: 1 – quality of participation; 2 – quality of management; 3 – administrative status of town; 4 – quality of life index (environmental part) (Śleszyński, 2021); 5 – population total (31.12.2020); 6 – NGOs indicator NGO/1000 inhabitants; 7 – number of NGO's focused on greenery, ecology (total); 8 – share of green areas in the town area; 9 – municipal income per capita; 10 – expenditure on greenery maintenance per inhabitant; 11 – expenditure on climate protection and wastewater management per capita; 12 – expenditure on water protection and wastewater management per capita.

All collected indicators were examined for a presence of mutual statistically significant correlation using statistical program PAST 4.3. Mutual correlation of collected data was examined using the Spearman correlation coefficient (Kendall, 1948). This method was chosen as collected data is characterized by lack of normal distribution.

In step 2), the original score classifications were developed. In addition to the survey-based assessment of governance that used the original score classification, the socio-spatial assets of the towns included in the study were determined using indicators from current reports, statistical data and registers (Table 1). Connor (1988) concluded, that there is no single best

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Table 2. Score classification

	A. Scope of the problem	B. Score scale	C. Explanation of scores
Part 1 participation	How often the town uses participatory and communicative methods in the GI management:		
	1A informing	0–4	0 – never 1 – rarely 2 – sometimes 3 – often 4 – very often
	1B public consultations with officials, experts	0–4	
	1C workshops	0–4	
	1D voting on the selection of a space development solution	0–4	
	1E civic budget	0–4	
	1F tools for reporting problems in urban space regarding greenery	0–4	
	1G local initiative	0–4	
Part 2 management	2A External programmes for financing GI investments	0–3	0 – no 1 – 1 project/1 source 2 – 2 projects/2 sources 3 – 3 projects/3 sources
	2B Documents on GI management	0–3	0 – no 1 – no dedicated document, but greenery provisions in local development plans 2 – one dedicated document 3 – at least 2 dedicated documents
	2C Any activities in the city supporting the development of GI	0–4	0 – no 1 – 1 action 2 – 2 actions 3 – 3 actions 4 – 4 actions
	2D Does the city conduct citizen satisfaction surveys regarding environment quality?	0–1	0 – no 1 – yes
	2E Does the city conduct surveys related to the Local Perceptions and frequency of using green areas?		
	2F Does the city conduct surveys regarding grassroots initiatives for green spaces?		

Source: own elaboration.

way to design the participatory ladder and manage the participation process, and it must reflect the specifics of the situation. Thus, we decided to apply the author's valorisation and modification of the participatory ladder.

In considering the question about the advancement scale of participation in the towns, we used the previously described canon of public participation, consisting of information, consultation and delegation of decisions (Arnstein, 1969; Carpentier, 2016). These are related to the governance activities described by Hester (1985) "for residents and community, with residents and community, and by residents and community". The ranking was prepared based on the question, how often does the town use participatory and communicative methods in the GI management process?

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The following rungs of the participation ladder were adopted:
- Rung 1 (lowest) – towns, where only "informing" was indicated (if town average score in 1A question scored at least 2, then the town reached this rung);
- Rung 2 (medium) – towns, where, in addition to Rung 1, "Organizing public consultations with officials, experts and voting on the choice of spatial planning solution" were indicated (if town average score in 1B or 1C questions was at least 2, then the town reached this rung);
- Rung 3 (highest) – towns, where in addition to the two above, "Organizing workshops" and "Civic budget/Local initiative" were indicated (we assumed that these are not facade activities) (if town average score in 1E or 1F questions of the survey was at least 2, then the town reached this rung).

Finally the results obtained in step 2 were compared with different indicators: population total and size class of town (medium or small), migration balance, quality of life index (environmental part) (Śleszyński, 2021), NGOs indicator (NGO/1000 inhabitants), number of NGO's focused on greenery, ecology, share of green areas in the city area, income per capita, expenditure on greenery maintenance per inhabitant, expenditure on air and climate protection per capita, expenditure on water protection and wastewater management per capita, and location within metropolitan NUTS-3 region.

Outputs

Regarding the four research questions formulated as the aim of the study, this part of the paper considers the following aspects:
- the importance of GI for local authorities and communities, as well as correlation of local policy on GI with size of a town and other socio-economic indicators (RQ1);
- participation and management advancement scale (RQ2, RQ3);
- SMT towns in and outside the metropolitan regions (RQ4).

RESULTS

Survey results

The survey questionnaire was completed by 97 different towns, i.e. 92 from town halls and 7 from NGOs. Tarnowskie Góry, Ząbki, Przemyśl and Kutno submitted the questionnaires completed by both town halls and NGOs. The responses to the survey question, "How often does the town use participatory and communicative methods in green space management?" are compiled in Table 3.

In ST, in terms of the frequency with which authority-resident communication methods are used, respondents point often to participatory budgeting

Table 3. How often does the town use participatory and communicative methods in green space management? – survey results, where: ST – small town, MST – medium-sized town

Participatory and communicative methods	Frequency [%]									
	Very often		Often		Sometimes		Rarely		Never	
	ST	MST	ST	MST	ST	MST	ST	MST	ST	MST
Organizing workshops e.g., educational, charette, project for public spaces	0	2	3	3	13	14	21	24	63	57
Voting on a solution of space development	3	3	3	10	36	14	21	36	37	37
Tools for reporting problems in urban green space, e.g., applications such as 123 survey, community wiz etc.	0	10	8	2	13	16	13	12	66	60
Participation budgeting	0	33	28	34	28	19	10	7	34	7
Grassroots citizen activities	3	3	10	14	18	45	46	29	23	9
Community consultations with officials, experts	3	3	0	9	28	45	36	29	33	14

Source: own elaboration.

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(28% of surveyed towns) and sometimes voting on development proposals (36%). In MST, the method exploited very often and often (67%) is participatory budgeting, while sometimes grassroots initiatives (45%). Grassroots initiatives are often and very often in 11 MST (Bielsk Podlaski, Bochnia, Brańsk, Legionowo, Mińsk Mazowiecki, Oleśnica, Przemyśl, Szczecinek, Tarnowskie Góry, Ząbki, Zduńska Wola) and only in 4 ST (Lipno, Mszana Dolna, Terespol, Zielonka) with often frequency.

Methods never implemented in more than half of the surveyed towns are workshops (63% in ST and 57% in MST) and applications and tools for reporting problems (66% in ST and 60% in MST). Most of the surveyed towns do not conduct surveys aimed at assessing satisfaction in terms of environmental quality, or perception of green spaces in the town (Table 4).

Table 4. Summary of responses to survey questions [YES/NO] by small (ST) and medium-sized towns (MST)

Question	Answer [%]			
	YES		NO	
	ST	MST	ST	MST
Does the town conduct citizen satisfaction surveys regarding environment quality?	15.8	28.8	84.2	71.2
Does the town conduct the survey related to the Local Perceptions and frequency of using green areas?	7.9	11.9	92.1	88.1
Does the town conduct surveys regarding grassroots initiatives for green spaces?	10.5	15.3	89.5	84.7

Source: own elaboration.

Of all the surveyed towns, only 23 (23.7% of all surveyed units) rarely carry out satisfaction surveys, where 5 are ST (Imielin, Przasnysz, Rawa Mazowiecka, Zielonka, Złotów) and 18 – MST (Będzin, Bielawa, Brańsk, Ełk, Gorlice, Jarosław, Kędzierzyn-Koźle, Konin, Krosno, Kutno, Mińsk Mazowiecki, Oleśnica, Oława, Suwałki, Świnoujście, Tomaszów Mazowiecki, Zakopane, Zambrów).

Consultations in MST, according to the questionnaire, are used in the participation process very often in 2 towns (Ełk, Gorlice), often in 6 towns (Brzeg, Gniezno, Lubartów, Przemyśl, Tarnowskie Góry, Bolesławiec). Among ST, only in Zielonka was a high frequency of use of this form of involving residents in town management. City of Zielonka operates a platform for public consultation https://zielonka.konsultacjejst.pl/konsultacje-spoleczne.

The responses to the survey question "Has the town received funding for GI in recent years (2014–2020) funding perspective?" are presented in Chart 1 and Chart 2.

The research indicates that 27.9% of all towns have no success in the context of financing green investments with external funds. 53.7% are towns that have made one investment from non-budgetary funds. 2–3 external projects have only 6.2% of small and 12.4% of medium-sized towns to their credit. A significant part of funds spent by towns on green areas are funds obtained from the European Union. The share of EU funding accounted for 56% of the value of the projects. Second place is taken by activities subsidized by the National Fund for Environmental Protection and Water Management. In the towns surveyed, private capital investment is invisible. The surveyed towns overwhelmingly used green space funding through a single external program (53.7%).

The responses to the survey question, "What actions has the town undertaken to support the GI development?" are presented below. This question verified whether the cities had developed documents regulating spatial policy concerning green areas (Chart 3). As many as 84.5% of the surveyed cities (82) did not develop any documents regulating the city's management of greenery. Among the 15.5% of settlement units having such documents, medium-sized towns (67%) dominated over small towns (33%). Presence of documents indicated by the surveyed cities was reported in Chart 4. The Environmental Protection Programme (EPP), although adopted in each municipality, because it is mandatory. The obligation to implement the EPP results from the Act of 27.04.2001 – Environmental Protection Law (Journal of Laws 2017, item 519). EPP does not fulfil the function of coordinating the greenery management process, as the surveyed cities did not link this document with green areas.

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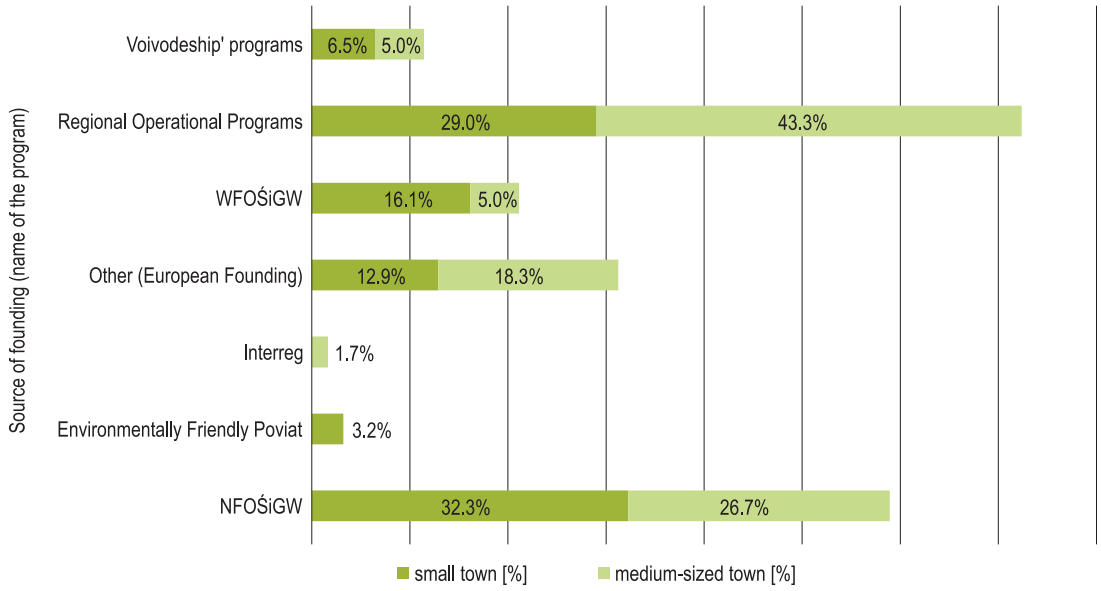

Chart 1. Share of SMT in different sources of funding
Source: own elaboration.

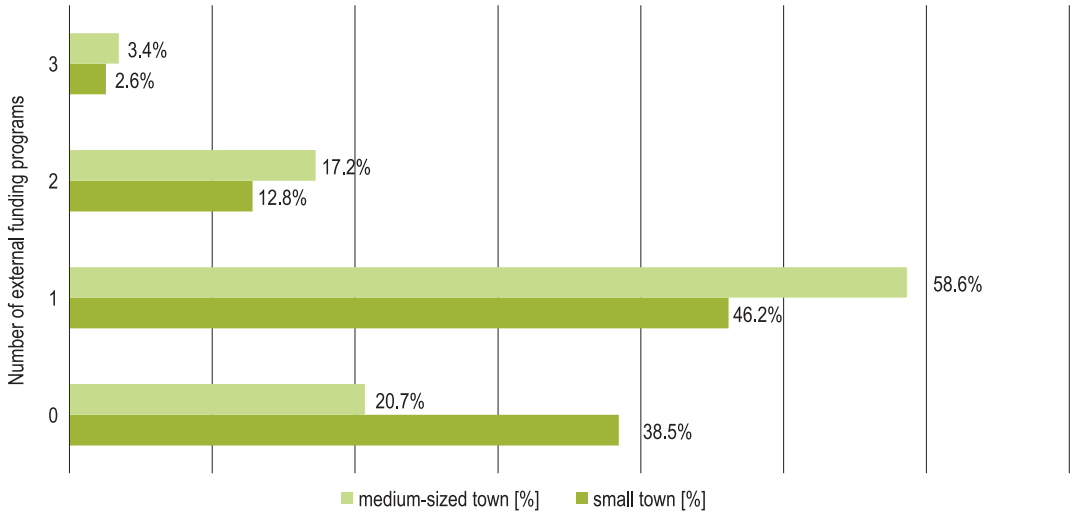

Chart 2. Percentage of SMT with 1, 2 or 3 external funding projects demonstration
Source: own elaboration.

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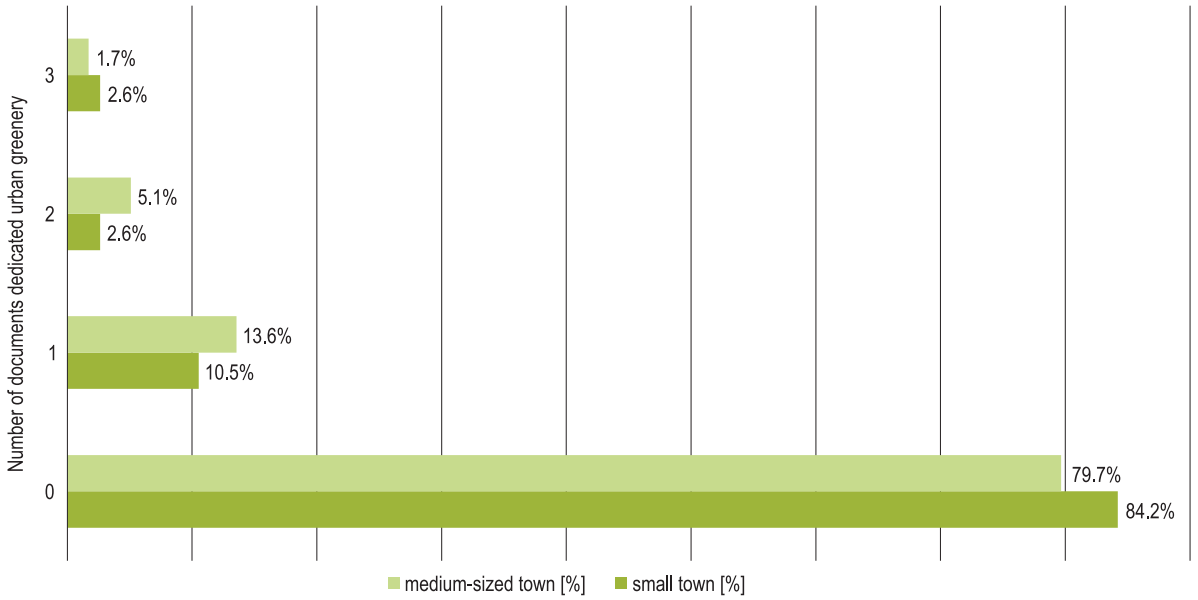

Chart 3. Percentage of SMT with 1, 2 or 3 documents regulating spatial policy
Source: own elaboration.

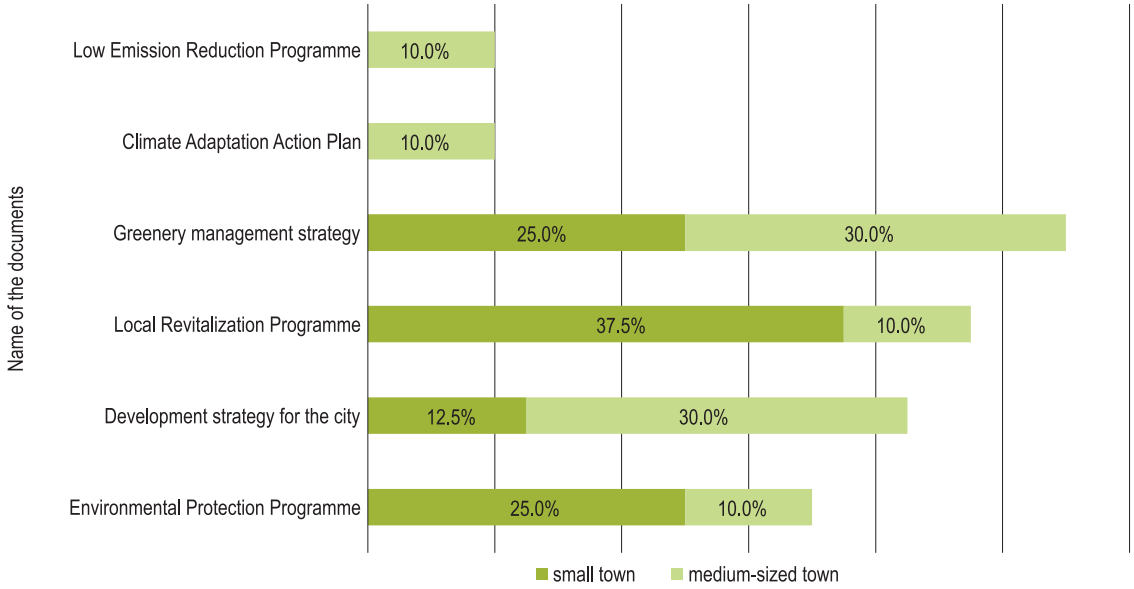

Chart 4. Percentage of SMT with different documents regulating spatial policy concerning green areas
Source: own elaboration.

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Correlations of indicators

Analysis of correlations between indicators presented in Table 1 allowed the discovery of several interesting relationships (Tab. 5). First relationship was quite strong positive correlation between quality of participation and quality of management measured by the survey. There was also quite strong positive correlation between quality of participation and size of the town (the bigger town in the terms of population, the higher level of participation). Weaker but still significant positive correlations were observed between the "Quality of Life Index" and quality of management measured by the survey. Size of a town and municipal income per capita were also positively correlated with "Quality of Life Index". Quality of management calculated measured by surveys was also positively correlated with number of NGOs per 1000 inhabitants and population level. What's also interesting share of green areas in town was positively correlated with population level. Very strong correlation between size of town and it's administrative status was obvious as it comes from Polish law.

Classes of participation and governance levels in the surveyed towns

The classes of participation and governance levels in the surveyed towns were calculated based on the participation ladder discussed in sub-section 2.2. The results of medium-sized towns were apparently better than those achieved by small towns. The median rung of the ladder obtained by the medium-sized

Table 5. Values of Spearman correlation factor, where: 1 – quality of participation (survey part I); 2 – quality of management (survey part II); 3 – administrative status of town; 4 – quality of life index (environmental part) (Śleszyński, 2021); 5 – population total (31.12.2020); 6 – NGOs indicator NGO/1000 inhabitants; 7 – number of NGO's focused on greenery, ecology (total); 8 – share of green areas in the town area; 9 – municipal income per capita (PLN); 10 – expenditure on greenery maintenance per inhabitant (PLN); 11 – expenditure on climate protection and wastewater management per capita (PLN); 12 – expenditure on water protection and wastewater management per capita (PLN); **the most statistically significant results are highlighted in bold**

	1	2	3	4	5	6	7	8	9	10	11	12
	A	B	C	D	E	F	G	H	I	J	K	L
A	1	**0.42359**	0.067775	0.27817	**0.36545**	0.085241	-0.13341	0.054788	-0.14345	-0.0376	0.1055	-0.03884
B	**0.42359**	1	0.098747	0.2811	0.27759	0.2755	-0.06042	0.11606	-0.01504	0.026495	-0.1932	-0.13042
C	0.067775	0.098747	1	0.15516	**0.45881**	0.025415	-0.03401	0.040146	0.14179	0.087615	-0.0969	-0.03886
D	0.27817	0.2811	0.15516	1	0.28362	0.051903	-0.06617	0.034503	0.24784	0.022631	0.069616	0.12582
E	**0.36545**	0.27759	**0.45881**	0.28362	1	0.038191	0.028975	**0.39427**	-0.00603	0.038207	-0.0817	-0.1418
F	0.085241	0.2755	0.025415	0.051903	0.038191	1	-0.09398	0.078716	0.14525	0.15632	-0.19367	0.026142
G	-0.13341	-0.06042	-0.03401	-0.06617	0.028975	-0.09398	1	0.03465	-0.01793	0.14736	0.000644	-0.12006
H	0.054788	0.11606	0.040146	0.034503	**0.39427**	0.078716	0.03465	1	-0.11568	0.028823	-0.16537	-0.14985
I	-0.14345	-0.01504	0.14179	0.24784	-0.00603	0.14525	-0.01793	-0.11568	1	0.16362	0.059346	0.20189
J	-0.0376	0.026495	0.087615	0.022631	0.038207	0.15632	0.14736	0.028823	0.16362	1	0.097624	0.10533
K	0.1055	-0.1932	-0.0969	0.069616	-0.0817	-0.19367	0.000644	-0.16537	0.059346	0.097624	1	0.1953
L	-0.03884	-0.13042	-0.03886	0.12582	-0.1418	0.026142	-0.12006	-0.14985	0.20189	0.10533	0.1953	1

Source: own elaboration.

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towns was Rung 2, while for small towns, it was just Rung 1. Another important fact is that the median participation level reached by towns in metropolitan regions was Rung 2 regardless of their size (Tab. 6).

Table 6. Median stage of participatory ladder

Median rung of the participation ladder	Town classes	
	ST	MST
All	Rung 1	Rung 2
Within metropolitan regions	Rung 2	Rung 2

Source: own elaboration.

Eighteen % of all small towns and 25% of small towns located within metropolitan regions reached Rung 3 of the participation ladder. A total of 26% of all small towns and 50% of small towns located within metropolitan regions reached Rung 2.38% of all small towns and 25% of small towns located within metropolitan regions reached Rung 1. Just 18% of all small towns and zero of the small towns located within metropolitan regions did not reach Rung 1 of the citizen participation ladder. 24 of all medium-sized towns and 35% of medium-sized towns located within metropolitan regions reached Rung 3.29% of all medium-sized towns and 18% of medium-sized towns located within metropolitan regions reached Rung 2.34% of all medium-sized towns and 41% of medium-sized towns located within metropolitan regions reached Rung 1. Just 9% of all medium-sized towns and 6% of medium-sized towns located within metropolitan regions failed to reach Rung 1 of the participation ladder.

Among small settlements, three town were recognized as Rung 3: Zielonka, Lipno, Terespol – each scored 5 points (Tab. 7). Two of them are located

Table 7. Characteristics of SMT classified as Rung 3 of participatory ladder

Rung 3 of participation ladder	Small towns			Medium-sized towns					
	Zielonka	Lipno	Terespol	Ełk	Mińsk Mazowiecki	Oława	Piekary Śl.	Tarnowskie Góry	Zgierz
Population	17486	14283	5457	61903	40916	33087	54702	61756	55673
Migration balance	5	-51	-17	83	-1	130	-112	342	-90
Quality of life index (environmental part) (Śleszyński 2021)	55.854	43.165	46.0441	48.620	54.838	54.642	50.422	56.678	52.986
NGOs Indicator NGO/1000 inhabitants	0.743	1.260	1.466	1.195	0.367	0.665	0.238	0.227	0.916
Number of NGO's focused on greenery, ecology	0	1	0	0	1	0	0	0	1
Share of green areas in the city area [%]	0.2	1.4	0.3	4.5	3.7	2.2	2.3	3.3	1.6
Income per capita [zł]	5396.86	4740.30	4134.36	4736.77	5383.43	4655.99	5844.77	5041.83	4519.24
Expenditure on greenery maintenance per inhabitant [zł]	60.56	28.58	17.26	66.37	33.75	5.33	144.59	15.22	7.27
Per capita expenditure on air and climate protection [zł]	-	-	404.71	-	2.67	4.78	135.60	22.25	-
Expenditure on water protection and wastewater management per inhabitant [zł]	6.10	-	2.72	71.64	-	63.50	16.16	151.23	4.35

Source: own elaboration based on https://bdl.stat.gov.pl/, https://spis.ngo.pl/, (Śleszyński, 2021).

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in non-metropolitan areas (Lipno, Terespol). Among the medium-sized towns, six received 5 points joining Rung 3 of the ladder: Ełk, Mińsk Mazowiecki, Oława, Piekary Śląskie, Tarnowskie Góry, Zgierz (Tab. 7). Two of these towns are also located in non-metropolitan areas (Ełk, Oława). On the official websites of the towns, there are subpages dedicated to the environment and ecology. Moreover, platforms for social consultations are being launched (e.g. https://zielonka.konsultacjejst.pl/). These towns have already completed revitalization projects (e.g., Zielonka, Terespol). It should be emphasized that in the case of municipal revitalization programs, public consultations are obligatory.

Based on the formulated strategic goals, it can be concluded that these towns are in the initiation phase as far as planning is concerned. Their activities aim to enrich urban greenery with places for the recreation and integration of residents. In addition, the towns received grants from the Regional Fund for Environmental Protection and Water Management for ecological education and the popularisation of pro-ecological behaviour among the inhabitants. Moreover, in medium-sized towns, municipal climate change adaptation plans are adopted.

Considering the results of our survey, location in a metropolitan area seems to play a role in the scale of participation. Six small towns exhibited a non-

Table 8. Characteristics of SMT classified on the non-participation rung

Non-participation rung of participation ladder	Small towns						Medium-sized towns				
	Gozdnica	Karpacz	Kowal	Maków Mazowiecki	Siemiatycze	Wysokie Mazowieckie	Grajewo	Hajnówka	Pabianice	Suwałki	Tomaszów Mazowiecki
Population	2977	4487	3468	9575	14210	9336	21709	20265	63945	69639	61338
Migration balance	-12	-13	7	-74	-117	-78	-62	-93	-200	-103	-349
Quality of life index (environmental part) (Śleszyński 2021)	46.749	50.700	53.026	48.626	51.852	50.453	50.990	45.740	55.315	53.296	49.192
NGOs Indicator NGO/1000 inhabitants	0.336	3.120	2.307	0.313	0.352	0.214	0.276	0.296	0.313	0.330	0.245
Number of NGO's focused on greenery, ecology	0	0	1	0	0	0	0	0	0	1	1
Share of green areas in the city area [%]	0.5	0.96	0.7	1.4	2.0	1.2	1.2	1.1	4.1	4.23	2.7
Income per capita [zł]	4940.75	6236.20	4972.11	5383.43	4463.01	6949.81	4709.62	4582.09	4595.66	3213.12	4838.14
Expenditure on greenery maintenance per inhabitant [zł]	4.07	386.16	147.06	10.13	9.13	37.60	260.76	22.69	8.33	32.51	9.60
Per capita expenditure on air and climate protection [zł]	-	21.57	-	-	-	205.03	-	224.20	12.74	2.69	0.48
Expenditure on water protection and wastewater management per inhabitant [zł]	1883.94	33.91	219.78	65.53	0.09	11.63	5.88	-	8.64	27.57	16.92

Source: own elaboration based on https://bdl.stat.gov.pl/, https://spis.ngo.pl/, (Śleszyński, 2021).

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participation rung, all situated in a non-metropolitan area: Gozdnica, Karpacz, Kowal, Maków Mazowiecki, Siemiatycze, Wysokie Mazowieckie. Medium-sized towns category is also dominated by non-metropolitan units: Grajewo, Hajnówka, Pabianice, Suwałki, Tomaszów Mazowiecki (Tab. 8). Even though in those lowest ranked towns, there are tools for informing the inhabitants and, for example, diagnostic activities were carried out in terms of identifying needs, preferences did not apply to the GI aspects. Even though in these lowest ranked towns there are tools for informing residents and there have been, for example, diagnostic activities for the identification of needs, the preference in this respect did not relate to any aspects of GI. In Suwałki, more than 100 requests for intervention in the aspect of development have been registered on the platform NaprawmyTo.pl, but they mainly focus on infrastructure and safety, the 'green alerts' concern pollution of the water's shoreline and nuisances related to rooks. Activities undertaken by the analyzed towns in 2022 provide a chance for advancement on the participation scale. For example, in Kowal a competition, "Kowal – the city of gardens," was announced that might contribute to social activation.

DISCUSSION

Recognising the importance of GI by town authorities and communities and regarding it as natural or social resources

Town authorities increasingly consult with residents on how to manage green areas. In the analysed towns, a tool such as participatory budget was used, but projects related to GI accounted for a small percentage of all submitted projects. This corresponds to the results of the SAO report (2017). Participatory budgeting as a form of communication with residents was used more often in medium-sized towns. The GI issue is considered in climate change adaptation plans, which, according to the government's draft, will become mandatory for towns with a population higher than 20,000. Less activity on the part of local authorities can be observed in small towns.

Moreover, the revitalization activities undertaken indicate that green areas are perceived as having ecological and social potential. In most towns with a non-metropolitan location, participatory activities focused on GI are at the initial stage. First, solving problems related to securing basic living needs (housing, social infrastructure, technical infrastructure) – the idea of the town as a safe, open space that meets residents' needs, offering stable living and working conditions. The next step is building community through greenery and participation.

The advancement scale of public participation in GI management and factors that determine this scale

As previously mentioned, the participation scale of Arnstein's ladder (1969) with later modifications (Connor, 1988; Krabina, 2016) assumes information and consultation as one of the lower levels and delegation of authority as the highest, requiring trust and taking mutual responsibility (Connor, 1988). The results of our research are dominated by one-sided communication: messages and information posted in municipal and communal offices, in a Public Information Bulletin, information on websites, in local media, brochures, leaflets, and posters. It is hard to believe that in SMT, where "everyone knows each other", there is a lack of public trust and the need for social control. One should instead think that the management of green spaces is not within the scope of the issues covered by participatory governance, so the reason should be sought in the attitude of residents and local authorities towards GI. We do not doubt that access to public greenery is an element of spatial justice and equality in the distribution of public resources (Egoz, 2017). It is believed that people in SMT have home gardens next to single-family houses and do not need to identify themselves with public green areas. As Cameron et al. (2012) stated home gardens provide a significant component of urban GI. It can be argued that where people have contact with nature (their garden), they also value a higher GI, so research on this topic should be continued (Barau, 2015; Santos et al., 2022). Self-maintenance of outdoor space, experience

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planting vegetation can play a role in rise people's awareness and engagement with local GI initiatives (Ordóñez Barona et al., 2021).

Political participation is one of the indicators of social maturity and at the same time the degree of democratisation of a country. The tool used to measure this phenomenon is the Democracy Index. Poland is ranked 46th (out of 167 countries) in 2022 as a flawed democracy, which places it among the last in Europe. A correlation can therefore be seen between political participation and public participation in the management of green spaces. A low level of political participation is the same as a low ranking of the surveyed cities on the participation ladder.

Moreover, attention should be paid to the procedures of the participation process in Poland. As mentioned earlier, the active participation of residents is increasingly emphasized in the programming of urban development, especially in environmental protection policies and use (Report 2021). Residents see the need to participate in environmental decision-making (Czupich, 2018). However, entities responsible for conducting the participatory process (local authorities) regard such participation (rung 3 of our scale) as an obligation posing a risk of conflict and dragging out investment activities indefinitely (Kaźmierczak, 2011; Pietraszko-Furmanek, 2012). Participation is perceived in a limited way by reducing it to a 1, or at most a 2 on the scale. "Participation nightmare", i.e., poor understanding through bad experiences of social conflicts caused by its low scale (Miessen, 2010), results in public participation in the management of public spaces in general and GI in particular. This explains the poor use of many stakeholders and diversified tools, including remote tools for community dialogue (Darvishmotevali & Altinay, 2022). The vicinity of the metropolis is also worth considering. We demonstrated the beneficial influence of the metropolis proximity on the participation scale. One can think that such a neighbourhood raises the awareness of authorities and inhabitants by showing good practice examples of governance and public participation in GI management. There is a flow of ideas from the big city to the small towns nearby. For example, Zielonka is located in the vicinity of Warsaw's administrative borders, Puszczykowo in the vicinity of Poznań, Konstantynów Łódzki near Łódź, Pyskowice in the vicinity of Gliwice, while Sławków in the vicinity of Katowice and Dąbrowa Górnicza. Because of its location, Sławków was included in the Functional Area Strategy – Green Infrastructure of Zagłębie Dąbrowskie, a partnership agreement of municipalities in Zagłębie Dąbrowskie, which included the towns of Sławków, Dąbrowa Górnicza, Sosnowiec and Będzin. Its location in the vicinity of major urban centres contributes to the implementation of development policy in a partnership arrangement and at the same time influences a large scale of social participation.

When planning participatory activities, as the above-mentioned small towns may not have sufficient social capital (practitioners able to carry out participatory processes), being located near large towns allows them to 'borrow', to draw on the experience of local practitioners listed e.g. on https://partycypacjaobywatelska.pl/.

Observable difference between small and medium-sized towns and the impact of proximity to metropolitan regions

Indicated research shows the observable difference between towns in and outside metropolitan regions. The difference concerns mainly small towns, with participation levels significantly higher within metropolitan regions than outside metropolitan regions. This may be the result of strong socio-economic polarization between the biggest metropolitan areas and other regions (Śleszyński, 2018; Węcłowicz et al., 2010). Municipalities located close to or within major metropolitan areas are characterized by better development trends, which results in better organizational and financial opportunities for conducting conscious and planned GI management. This does not apply to metropolitan regions of smaller towns (less than 500,000 inhabitants), which do not differ much from other NUTS-3 regions. Another fact that may explain such results is that most towns located within metropolitan regions play the role of satellite towns

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of the central city. Therefore, the lifestyle of many of their inhabitants resembles that of inhabitants of a city, not a town (Gonda-Soroczyńska, 2009).

The population of small towns does not get involved in green space management because of its low economic status, unemployment. If people don't have economic security they don't think about some higher goals (e.g. participation in town development). In contrast, medium-sized towns, especially those that are intensively urbanised, are developing and residents increasingly value greenery. They accept pro-environmental activities and engage in participatory processes.

CONCLUSIONS

The level of participation is connected with the maturity of the local community. In mature community the citizen participates in all activities (Maciel & Garcia, 2007). According to this, Polish population in SMT is immature. Participation is in initial process, unpredictable. Small towns are classified on rung 1 of the participation ladder, while medium-sized towns on rungs 2 and 3. A higher level of community engagement is registered in towns located in the metropolitan areas.

The level of participation in decision-making as well as quality of management is correlated with the size of town and strength of local civil society Social participation requires a financial and social resource to afford activities. It's also important to notice that environmental indicators of quality of life are higher in towns with higher quality of management and participation policies.

In small Western-European towns outside the metropolis the population is particularly attached to their place of residence, which should manifest in engagement in participatory processes (Milbert & Porsche, 2022), at this stage of research no such relationship is apparent in Poland. Future research will need to explore this aspect. Activating the population in small towns is often not easy (Milbert & Porsche, 2022). Many barriers in the aspect of involving residents in participation are due to the historical background. Solution for the engagement of SMT in the ladder of participation should be seen in EU funding. The vast majority of acts which oblige to organise forms of public participation derive directly from international regulations. The European Union plays an important role in initiating activities related to civic participation, preferring to finance projects prepared in this spirit (Gorączko, 2019).

Even though civil society has been steadily developing in Poland since 1990, there is still a significant need to shape awareness and attitudes among local communities. Two issues need to be mentioned when looking at the reasons for the low participation level in most of the towns and the positive effect of proximity to metropolitan cities. Firstly, the quantitative methods used have some shortcomings (only selected social, economic, and spatial indicators were examined, and the quantitative data should be enriched by deeper qualitative research). Secondly, municipalities and NGOs seem unaware of the importance of GI as a tool for public participation in urban management. Exploring these reasons with the help of in-depth qualitative research will help to find ways to raise this awareness based on the common GI values of the inhabitants.

Significant differences in the results obtained by towns within and outside metropolitan regions may be another argument supporting the idea of replacing the administrative approach with a functional approach. The functional approach looks at different specifics of municipalities going beyond classical administrative categorization.

The research will be continued. In the next phase, we intend to focus on social issues and management. Through interviews, surveys and field studies, we will learn the views and expectations of city dwellers regarding GI management mechanisms. In addition, we will examine which institutions and organizations influence GI planning and protection and how its development and modernization are financed.

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REFERENCES

Ambrose-Oji, B., Buijs, A., Gerőházi, E., Mattijssen, T., Száraz, L., van der Jagt, A., Hansen, R., Rall, E. A., Kronenberg J., & Rolf, W. (2017). *Innovative Governance for Urban Green Infrastructure: a Guide for Practitioners*, GREEN SURGE project. Deliverable 6.3, University of Copenhagen, Copenhagen.

Aquilina, M. C., & Sheate, W. R. (2021). A critical analysis of the role of the urban climate resilience nexus in London. *European Planning Studies*, *30*(7), 1355–1377. https://doi.org/10.1080/09654313.2021.1958758

Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners*, *35*(4), 216–224. https://doi.org/10.1080/01944366908977225

Arshad, H. S. H., & Routray, J. K. (2018). From socioeconomic disparity to environmental injustice: the relationship between housing unit density and community green space in a medium city in Pakistan. *Local Environment*, *23*(5), 536–548. https://doi.org/10.1080/13549839.2018.1442424

Atkinson, R. (2017). Policies for Small and Medium-Sized Towns: European, National and Local Approaches. *Journal of Economy and Human Geography*, *108*(4), 472–487. https://doi.org/10.1111/tesg.12253

Atkinson, R. (2019). The Small Towns Conundrum: What do we do About Them? *Regional Statistics*, *9*(2), 3–19. https://doi.org/10.15196/RS090201

Bański, J. (2012). Problematyka definicji i zasięgu przestrzennego obszarów wiejskich i stref podmiejskich [Definitions and spatial range of rural areas and suburban zones]. *Acta Scientiarum Polonorum. Administratio Locorum*, *11*(3), 5–15. https://doi.org/10.31648/aspal.4277

Bański, J. (2022). The classification of small towns: a review of research approaches and an attempt at multi-criteria classification. *Przegląd Geograficzny*, *94*(2), 199–218. https://doi.org/10.7163/PrzG.2022.2.2

Bański, J. (Ed.) (2023). *Atlas małych miast [Small towns atlas]*. IGiPZ PAN.

Barau, A. S. (2015). Perceptions and contributions of households towards sustainable urban green infrastructure in Malaysia. *Habitat International*, *47*, 285–297. https://doi.org/10.1016/j.habitatint.2015.02.003

Belčáková, I., Świąder, M., & Bartyna-Zielińska, M. (2019). The Green Infrastructure in Cities as A Tool for Climate Change Adaptation and Mitigation: Slovakian and Polish Experiences. *Atmosphere*, *10*(9), Article 552. https://doi.org/10.3390/atmos10090552

Bogdanowski, J. (1976). *Kompozycja i planowanie w architekturze krajobrazu [Composition and planning in landscape architecture]*. Wydawnictwo Polskiej Akademii Nauk [Polish Academy of Sciences Publishin House].

Cameron, R., Blanuša, T., Taylor, J., Salisbury, A., Halstead, A., Henricot, B., & Thompson, K. (2012). The domestic garden – Its contribution to urban green infrastructure. *Urban Forestry & Urban Greening*, *11*(2), 129–137. https://doi.org/10.1016/j.ufug.2012.01.002

Carbonaro, G., Leanza, E., McCann, P., & Medda, F. (2018). Demographic decline, population aging, and modern financial approaches to urban policy. *International Regional Science Review*, *41*(2), 210–232. https://doi.org/10.1177/0160017616675916

Carpentier, N. (2016). Beyond the ladder of participation: An analytical toolkit for the critical analysis of participatory media processes. *Journal of the European Institute for Communication and Culture*, *23*(1), 70–88. https://doi.org/10.1080/13183222.2016.1149760

Certoma, C., Corsini, F., & Rizzi F. (2015). Crowdsourcing urban sustainability. Data, people and technologies in participatory governance. *Futures*, *74*, 93–106. https://doi.org/10.1016/j.futures.2014.11.006

Certoma, C., Sondermann, M., & Noori S. (2019). *Urban gardening and the struggle for social and spatial justice*. Manchester University Press.

Coley, R. L., Sullivan, W. C, & Kuo, F. E. (1997). Where does community grow? The social context created by nature in urban public housing. *Environment and Behavior*, *29*(4), 468–494. https://doi.org/10.1177/001391659702900402

Connor, D. M. (1988). A New Ladder of Citizen Participation. *National Civic Review*, *77*(3), 249–257. https://doi.org/10.1002/ncr.4100770309

Conway, T. M., Khan, A., & Esak, N. (2020). An analysis of green infrastructure in municipal policy: Divergent meaning and terminology in the Greater Toronto Area. *Land Use Policy*, *99*, Article 104864. https://doi.org/10.1016/j.landusepol.2020.104864

Crawford, P., Kotval, Z., Rauhe, W., & Kotval, Z. (2008). Social capital development in participatory community planning and design. *The Town Planning Review*, *79*(5), 533–553. https://www.jstor.org/stable/40112781

Czupich, M. (2018). Level of Social Participation in the Creation of Urban Regeneration Programmes –The Case Study of Small Towns in Poland. *European*

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Spatial Research and Policy, *25*(2), 81–98. https://doi.org/10.18778/1231-1952.25.2.05

Darvishmotevali, M., & Altinay, L. (2022). Green HRM, environmental awareness and green behaviors: The moderating role of servant leadership. *Tourism Management*, *88*, Article 104401. https://doi.org/10.1016/j.tourman.2021.104401

Demazière, C. (2017). Dealing with small and medium-sized towns (SMSTs) in urban studies. *Espaces et sociétés*, *168–169*(1), 17–32. https://www.cairn-int.info/journal--2017-1-page-17.htm

Denhardt, R. B., & Denhardt, J. V. (2000). The new public service: Serving rather than steering. *Public Administration Review*, *60*(6), 549–559. https://www.jstor.org/stable/977437

ESPON (2006). *The Role of Small and Medium-Sized Towns (SMESTO). Executive Summary*. https://www.bbsr.bund.de/BBSR/DE/forschung/programme/espon/Projekte/BBRBeteiligung/Projekt141/141_summary_pdf.pdf?__blob=publicationFile&v=1

European Cities and Regions of the Future. (2023). https://www.fdiintelligence.com/content/rankings-and-awards/european-cities-and-regions-of-the-future-2023-the-winners-82056

Florida, R. (2005). *Cities and the creative class*. Routledge.

Gaber, J. (2019). Building "A Ladder of Citizen Participation" Sherry Arnstein, Citizen Participation, and Model Cities. *Journal of the American Planning Association*, *85*(3), 188–201. https://doi.org/10.1080/01944363.2019.1612267

Gawryszewska, B. J., & Wilczyńska, A. (2016). Creative urban areas or urban gardening as a process of contemporary cityscape making. In J. Słyk, L. Bezerra (Eds.), *Education for research, research for creativity, Architecture for the Society of Knowledge* (pp. 248–253). Wydawnictwo Politechniki Warszawskiej [Warsaw University of Technology Publishing House].

Gawryszewska, B. J., Łepkowski, M., & Wilczyńska, A. (2019). City wastelands: Creating places of vernacular democracy. In C. Certoma, S. Noori, & M. Sondermann (Eds.), *Urban gardening and the struggle for social and spatial justice* (pp. 38–58). Manchester University Press.

Gonda-Soroczyńska, E. (2009). Last decade Wroclaw suburban zone transformations. *Infrastructure and Ecology of Rural Areas*, *4*, 149–165.

Gorączko, J. (2019). Social Participation in Selected Polish Cities as an Instrument of Social Communication. *Media – Culture – Social Communication*, *1*(12), 13–30. https://doi.org/10.31648/mkks.3037

GUS. (2022). *Demographic situation in Poland up to 2021*. Statistics Poland.

Hester, R. (1985). Subconscious landscapes of the heart. *Places*, *2*(3), 10–22. https://escholarship.org/uc/item/608645gj

Hrynkiewicz, J., & Szukalski, P. (2018). Population Policy: Between Shaping Demographic Processes and Reacting to Them. *Polityka Społeczna [Social Policy]*, *1*(14), 20–24.

Janiszek, M. A., & Krzysztofik, R. (2023). Green Infrastructure as an Effective Tool for Urban Adaptation – Solutions from a Big City in a Postindustrial Region. *Sustainability*, *15*(11), Article 8928. https://doi.org/10.3390/su15118928

Kaźmierczak, T. (2011). Partycypacja publiczna: pojęcie, ramy teoretyczne [Public participation: concept, theoretical framework]. In A. Olech (Ed.), *Partycypacja publiczna. O uczestnictwie obywateli w życiu wspólnoty lokalnej* [*Public Participation. On citizen participation in the life of the local community*] (pp. 83–99). Institute of Public Affairs.

Kendall, M. G. (1948). *Rank Correlation Methods*. Charles Griffin & Company Limited.

Kobojek, E., & Marszał, T. (2014). Local development and the role of small towns in space organisation in contemporary Poland. In T. Marszał (Ed.), *Spatial Development of Contemporary Poland in Łódź University Geographical Rersearch* (pp. 37–60). Łódź University Press.

Korkou, M., Tarigan A., & Hanslin, H. M. (2023). The multifunctionality concept in urban green infrastructure planning: A systematic literature review. *Urban Forestry & Urban Greening*, *85*, Article 127975. https://doi.org/10.1016/j.ufug.2023.127975

Krabina, B. (2016). *The E-Participation Ladder – Advancing from Unawareness to Impact Participation*. 10th Conference for e-Democracy and Open Government (CeDEM 2016). https://www.researchgate.net/publication/303371027_The_E-Participation_Ladder_-_Advancing_from_Unawareness_to_Impact_Participation

Maciejewska, A., & Ulanicka-Raczyńska, M. (2023). Lack of Spatial Planning as a Cause of Environmental Injustice in the Context of the Provision of Health Safety to Urban Residents Based on the Example of Warsaw. *Sustainability*, *15*, Article 2521. https://doi.org/10.3390/su15032521

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Maciel, C., & Garcia, A. C. (2007). Design and Metrics of a 'Democratic Citizenship Community' in Support of Deliberative Decision-Making. In M. A. Wimmer, J. Scholl J., & A. Grönlund (Eds.), *Electronic Government. EGOV 2007. Lecture Notes in Computer Science* (pp. 388–400). Springer.

Marot, N., Golobič, M., & Müller, B. (2015). Green infrastructure in Central, Eastern and South Eastern Europe: A universal solution to current environmental and spatial challenges? *Urbani Izziv*, *26*, 1–12. https://doi.org/10.5379/urbani-izziv-en-2015-26-supplement-000

Mazur-Belzyt, K. (2020). *Małe Miasta w Dobie Równoważenia Rozwoju* [*Small Town Sustainability*]. Wydawnictwo Politechniki Śląskiej [Silesian University of Technology Publishing House].

Mees, H. L., Uittenbroek, C. J., Hegger, D. L., & Driessen, P. P. (2019). From citizen participation to government participation: An exploration of the roles of local governments in community initiatives for climate change adaptation in the Netherlands. *Environmental Policy and Governance*, *29*(3), 198–208. https://doi.org/10.1002/eet.1847

Mell, I. C. (2013). Can you tell a green field from a cold steel rail? Examining the "green" of Green Infrastructure development. *Local Environment*, *18*(2), 152–166. https://doi.org/10.1080/13549839.2012.719019

Miessen, M. (2010). *The nightmare of participation*. Sternberg Press.

Ministerstwo Infrastruktury i Rozwoju. (2015). *Krajowa Polityka Miejska do roku 2023 [National Urban Policy until 2023]*. https://www.funduszeeuropejskie.gov.pl/media/74967/Krajowa_Polityka_Miejska_2023.pdf

Milbert, A., & Porsche L., (2022). *Small Towns in Germany*. BBSR-Analysen KOMPAKT 02. https://www.bbsr.bund.de/BBSR/EN/publications/AnalysenKompakt/Issues/ak-2022-02-dl.pdf?__blob=publicationFile&v=2

Morisson, A. (2022). Agents of change in small and medium-sized towns. In H. Mayer, & M. Lazzeroni (Eds.), *A Research Agenda for Small and Medium-Sized Towns* (pp. 179–193). Edward Elgar Publishing.

Nowak, E. (1990). *Metody taksonomiczne w klasyfikacji obiektów społeczno-gospodarczych* [*Taxonomic methods in the classification of socio-economic objects*]. PWE.

Ordoñez Barona, C., Conway, T., & Roman L. (2021). Intention to Install Green Infrastructure Features in Private Residential Outdoor Space. *Frontiers in Sustainable Cities*, *3*, Article 805884. https://doi.org/10.3389/frsc.2021.805884

Otsuka, N., Abe, H., Isehara, Y., & Miyagawa, T. (2021). The potential use of green infrastructure in the regeneration of brownfield sites: three case studies from Japan's Osaka Bay Area. *Local Environment*, *26*(11), 1346–1363. https://doi.org/10.1080/13549839.2021.1983791

Pichler-Milanovič, N., & Foški, M. (2015). Green infrastructure and urban revitalisation in Central Europe: Meeting environmental and spatial challenges in the inner city of Ljubljana, Slovenia. *Urbani izziv*, *26*, 50–64. https://doi.org/10.5379/urbani-izziv-en-2015-26-supplement-004

Pietraszko-Furmanek, I. (2012). *Partycypacja społeczna w środowiskach lokalnych* [*Social participation in local communities*]. Andrzej Frycz Modrzewski Krakow University Publishing House. https://repozytorium.ka.edu.pl/server/api/core/bitstreams/e3284598-76b6-4b09-8a93-2683f9a5cfe6/content

Pinilla, V., Ayuda, M. I., & Sáez, L. A. (2008). Rural depopulation and the migration turnaround in Mediterranean Western Europe: a case study of Aragon. *Journal of Rural and Community Development*, *3*(1), 1–22. https://journals.brandonu.ca/jrcd/article/view/91/33

Runge, J., Michalski, T., & Runge, A. (2020). The level of preparedness among the local governments of the Katowice conurbation for risks associated with depopulation and ageing of the population. *Studies of Transition States and Societies*, *12*(2), 77–91. https://www.ssoar.info/ssoar/handle/document/71480

Rydz, E. (Ed.) (2007). *Podstawy i perspektywy rozwoju małych miast* [*Fundamentals and perspectives of small town development*]. Akademia Pomorska w Słupsku [Pomeranian University in Słupsk].

Santos, M., Moreira, H., Cabral, J. A., Gabriel, R., Teixeira, A., Bastos, R., & Aires, A. (2022). Contribution of Home Gardens to Sustainable Development: Perspectives from A Supported Opinion Essay. *International Journal of Environmental Research and Public Health, 19(20),* Article 13715. https://doi.org/10.3390/ijerph192013715

SAO (Supreme Audit Office – Najwyższa Izba Kontroli) (2017). *Zarządzanie zielenią miejską [Urban greenery management]*. https://www.nik.gov.pl/plik/id,15863,vp,18378.pdf

Sawhney, P., Kobayashi, M., Takahashi, M., King, P. N., & Mori, H. (2007). Participation of civil society

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in management of natural resources. *International Review for Environmental Strategies*, *7*(1), 117–132. https://www.iges.or.jp/system/files/publication_documents/pub/peer/526/IRES_Vol.7-1_117.pdf

Schlappa, H., & Nishino, T. (2021). *Addressing Urban Shrinkage in Small and Medium Sized Towns: Shrink Smart and Re-grow Smaller*. Emerald Group Publishing.

Selman, P. (2004). Community participation in the planning and management of cultural landscapes. *Journal of Environmental Planning and Management*, *47*(3), 365–392. https://doi.org/10.1080/0964056042000216519

Servillo, L., Atkinson, R., Smith, I., Russo, A., Sýkora, L., Demazière, C., & Hamdouche, A. (2014). *TOWN, small and medium sized towns in their functional territorial context, Final Report*. ESPON.

Sikorski, P., Gawryszewska, B., Sikorska, D., Chormański, J., Schwerk, A., Jojczyk, A., & Łaszkiewicz, E. (2021). The value of doing nothing–How informal green spaces can provide comparable ecosystem services to cultivated urban parks. *Ecosystem Services*, *50*, Article 101339. https://doi.org/10.1016/j.ecoser.2021.101339

Sobczyńska, K. (2014). *Zieleń jako element współczesnego miasta i jej rola w przestrzeniach publicznych Poznania* [*Greenery as an element of a contemporary city and its role in public spaces of Poznań*] [Unpublished doctoral dissertation]. Poznań University of Technology.

de Sousa Silva, C., Viegas, I., Panagopoulos, T., & Bell, S. (2018). Environmental Justice in Accessibility to Green Infrastructure in Two European Cities. *Land*, *7*(4), Article 134. https://doi.org/10.3390/land7040134

Stanny, M., Śliwowska, Z., & Hoffmann, R. (2016). Miasto – wieś: dychotomia czy continuum? Rozważania osadzone w trzech kontekstach: socjologicznym, ekonomicznym i geograficznym [Town – village: dichotomy or continuum? Reflections in three contexts: sociological, economic and geographical]. *Zeszyty Naukowe Wydziału Nauk Ekonomicznych* [*Research Bulletins of the Faculty of Economic Sciences*], *3*, 265–279.

Śleszyński, P. (2016). *Delimitacja miast średnich tracących funkcje gospodarcze* [*Delimitation of medium-sized towns losing economic functions*]. https://www.power.gov.pl/media/66970/Delimitacja_miast_srednich_tracacych_funkcje_spoleczno_gospodarcze_2.pdf

Śleszyński, P. (2018). *Polska Średnich Miast – Założenia Deglomeracji w Polsce* [*Poland of Medium-Sized Cities – the Foundations of Deglomeration in Poland*]. https://klubjagiellonski.pl/publikacje/polska-srednich-miast-zalozenia-i-koncepcja-deglomeracji-w-polsce/

Śleszyński, P. (2021). *Gmina dobra do życia. Wskaźniki jakości życia w gminach 2021* [*A municipality good to live in. Quality of life indicators in municipalities 2021*]. https://samorzad.pap.pl/sites/default/files/2021-11/Raport_Gmina_dobra_do_zycia_0.pdf

Vaňo, S., Stahl Olafsson, A., & Mederly, P. (2021). Advancing urban green infrastructure through participatory integrated planning: A case from Slovakia. *Urban Forestry & Urban Greening*, *58*, Article 126957. https://doi.org/10.1016/j.ufug.2020.126957

Walsh, L. E., Mead, B. R., Hardman, Ch. A., Evans, D., Liu, L., Falagán, N., Kourmpetli, S., & Davies, J. (2022). Potential of urban green spaces for supporting horticultural production: a national scale analysis. *Environmental Research Letters*, *17*, 1–14. https://doi.org/10.1088/1748-9326/ac4730

Weyers, S., Dragano, N., Möbus, S., Beck, E. M., Stang, A., Möhlenkamp, S., Jöckel, K. H., Erbel, R., & Siegrist, J. (2008). Low socio-economic position is associated with poor social networks and social support: results from the Heinz Nixdorf Recall Study. *International Journal for Equity in Health*, *7*(13). https://doi.org/10.1186/1475-9276-7-13

Węcłowicz, G., Łotocka, A., & Baucz A. (2010). *Rozwój miast w Polsce* [*Development of cities in Poland*]. https://eregion.wzp.pl/sites/default/files/rozwoj_miast_w_polsce_0.pdf

Wilker, J., & Rusche, K. (2014). Economic valuation as a tool to support decision-making in strategic green infrastructure planning. *Local Environment*, *19*(6), 702–713. https://doi.org/10.1080/13549839.2013.855181

Wright, H. (2011). Understanding green infrastructure: the development of a contested concept in England. *Local Environment*, *16*(10), 1003–1019. https://doi.org/10.1080/13549839.2011.631993

Zachariasz, A. (2006). *Zieleń jako współczesny czynnik miastotwórczy ze szczególnym uwzględnieniem roli parków publicznych* [*Green areas as a modern town creating factor with particular role of public parks*]. Politechnika Krakowska [Cracow University of Technology Publishing House].

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