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WHAT MAKES CITIZENS SATISFIED? ECOLOGICAL ASPECTS OF NEIGHBOURHOOD SATISFACTION IN CROATIAN CITIES IN SOCIALIST AND POST-SOCIALIST HOUSING ESTATES

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Abstract
Neighborhood satisfaction is one of dimensions of the quality of life. It is explored in relation to the perception of life satisfaction in urban areas, and regarded as an indicator of the quality of housing policies. Nowadays especially, the concept of life satisfaction includes ecological characteristics of the environment. This paper examines the ecological aspects of life satisfaction in large Croatian cities (Zagreb, Split, Rijeka, Osijek), and the ecological aspects of life satisfaction in large housing estates (LHE), built both in the socialist and post-socialist periods. The research was conducted using mixed methodology; the questionnaire was applied on a sample of N=1,536 inhabitants, and focus groups were carried out with residents of socialist and post-socialist housing estates. The results show that the residents of the cities and estates are most satisfied with natural resources, i.e. the quality of water and air, less satisfied with the level of noise, and least satisfied with the way waste is disposed and removed. In that regard, there are statistically significant differences among cities, as well as estates, in relation to the period when they were built. Regarding the green infrastructure, previous research has shown that due to a lack of planning and the market conditions of post-socialist construction, the estates from this period have deficient green areas. Furthermore, the residents of all estates think that the greening of the environment is a priority, due to climate change, but also for ensuring the quality of life in them.

Keywords: *ecological aspects, green infrastructure, post-socialist estates, socialist estates, urban planing*

1. INTRODUCTION: HOUSING AND NEIGHBOURHOOD SATISFACTION

There are plenty of authors and a variety of disciplines contributing to the development of definitions of the "quality of life" (Ryan and Deci 2001; Millennium Ecosystem Assessment 2005; MacKerron 2011), acknowledging that this is a complex phenomenon, involving a great number of dimensions. The operational 2011 definition of the OECD emphasises that the notion of the quality of life encompasses eleven dimensions: housing, income and wealth, employment, social connections, education and skills, environmental quality, civic engagement, health status, subjective well-being, personal safety, and work-life balance (OECD 2011).

Housing satisfaction is one of the dimensions of the quality of life, and the one reflecting it. Zanuzdana et al. (2012) point to the popularity of this concept in the last few decades, as well as its relation to the self-perceived satisfaction with life in urban areas, and to indicators of mental and physical health and overall well-being of residents. Besides, their research also emphasises the importance of socio-physical characteristics of the environment, which are relevant for the present paper. Empirical studies analysing residential satisfaction employ one of the two approaches (Weidemann and Anderson 1985). According to the first, residential satisfaction represents a predictor of behaviour (change or renovation of a flat), while the second one measures it by the criterion of housing quality (Amérigo and Aragonés 1997; Parkes et al. 2002; Pinquart and Burmedi 2003).

Various scholars have tried to identify key factors determining the level of neighbourhood satisfaction, as one of the important segments of the quality of housing. The construct of "neighbourhood features" includes three main dimensions affecting neighbourhood satisfaction: 1. satisfaction with the physical features of the neighbourhood, 2. satisfaction with the social features of the neighbourhood, and 3. satisfaction with the economic features of the neighbourhood (Sirgy and Cornwell 2002:83). According to the model proposed by Sirgy and Cornwell, a significant, yet still lesser connection with neighbourhood satisfaction refers to satisfaction with the physical features of the neighbourhood, compared to satisfaction with the economic or social features of the neighbourhood, respectively. The key elements from the group of the physical features of the neighbourhood are: 1. satisfaction with the landscape in the neighbourhood, 2. satisfaction with the crowdedness and level of noise, and 3. satisfaction with the quality of the environment in the community (Sirgy and Cornwell 2002).

The subjective assessment of housing quality was provided by Cooper and Rodman (1994), who define it as an: 1. assessment of the utility and aesthetic value of the buildings (extended to the immediate living environment, i.e., neighbourhood), and 2. assessment of concern for the health and well-being of residents, compared to the external and internal conditions in the neighbourhood. The concern over the health and general well-being of the residents refers to the aspects of ecological elements of the neighbourhood: noise, air and water pollution, maintenance of green areas (parks),[1] and cleanliness. It is these elements that are the focus of the present research.

In this paper, we present the results of a subjective assessment of residents' satisfaction with the physical features of LHEs in four Croatian cities. There is no universally accepted definition of LHEs (Turkington et al. 2004), but they can generally be categorised based on a shared set of characteristics. According to Wassenberg (2018), LHEs are composed of apartment building complexes that vary in form but are typically developed as large-scale, planned projects within a local context. These estates often feature high-rise buildings that are tall enough to require lifts, in accordance with legal standards (Hess et al. 2018, 9). LHEs are usually conceived as coherent and compact urban units, and while they often house at least 1,000 residents, the population size alone is not the defining criterion for classification into this category.

The analysis regards *housing environment*, i.e., neighbourhood, by considering the ecological aspects of that environment: noise, air and water pollution, availability and quality of green areas, and satisfaction with the maintenance, general cleanliness, and waste collection and removal. Particular attention will be given to the green areas, i.e., the green infrastructure and its availability and quality in urban areas.

The whole matter is seen through the prism of the period when the estates were built. We thus included in the analysis the satisfaction with the physical features of the estate, regarding whether they were built in the socialist or post-socialist period in Croatia.

2. SOCIALIST AND POST-SOCIALIST HOUSING ESTATES

Socialist housing estates played a key role in the state-led planning and development of urban areas. Their primary objective was to modernise and expand cities in response to the low levels of urbanisation following the Second World War. During the post-war period, socialist society evolved under the guidance of centralised state institutions. By the 1950s, a system of central planning had taken shape, directing economic and urban development. Housing production reached its peak in the late 1960s and early 1970s, coinciding with a development in high-rise residential construction. A significant milestone came in 1976 with the adoption of the document DUSI (Društveno usmjerena stanogradnja, eng. Socially Directed Housing), which introduced the concept of the housing estate as a comprehensive, self-contained residential community. This vision of socially directed housing was supported by an integrated effort to standardise housing parameters[2].

The DUSI framework encapsulated the idea of a housing estate not merely as a collection of dwellings, but as a holistic living environment.

Following Croatia's declaration of independence in 1991, a sweeping process of privatisation began across all social sectors, including housing. This led to a mass repurchase of previously state-owned or publicly rented apartments by their residents. As a result, the

1 The quality of urban residents' lives depends on their ability to shape, influence, and maintain the utility value of their living spaces, apartments, and immediate surroundings (Cooper and Rodman 1992; Logan and Molotch 1987).

2 The outcome was a document titled *The Standard of the Flat, Building, and Estate in Socially Directed Housing Development*, which laid out detailed design and planning guidelines (Jukić et al., 2011, p. 30).

vast majority of the housing stock in Croatian housing estates transitioned into private ownership (Svirčić Gotovac et al. 2021a). However, this shift was accompanied by significant challenges, most notably, the lack of maintenance for communal building areas. Private ownership of construction land was reinstated, new legislation was introduced, and the previously organised processes of residential construction were effectively dismantled. Therefore, an analysis of housing standards and associated infrastructural provisions, through a comparison of spatial building standards and the urban-technical requirements outlined in the Zagreb Master Plans of 1971, 1986, 2000, 2003, and 2007, reveals a clear trend of gradual reduction over several decades, with certain standards eventually being eliminated entirely (Jukić et al. 2011, 103). The latest research on the differences between the old and new estates in accessibility to neighbourhood services and infrastructure shows that most of the deficiencies found in new housing estates and locations are due to an inadequate level of neighbourhood equipment (Svirčić Gotovac et al., 2024, 147).
Post-socialist or new residential estates built after 1990 were created in several ways and can be autonomous residential units planned by the city or the state (e.g., POS settlements[3], example POS Španska-Oranice), but also complexes of buildings (so-called new construction) built as new residential locations with densely built buildings without planned incorporated supporting infrastructure (e.g., in Zagreb Lanište-Jaruščica or in Split Kila) (Picture 1) (Svirčić Gotovac and Đokić, 2023:17).

Picture 1.

Split: Kila-POS – a negative example of a new estate with insufficient infrastructure and without green areas
Source: Svirčić Gotovac and Đokić, 2023: 126

Post-socialist or new residential built after 1990 were created in several ways and can be autonomous residential units planned by the city or the state (e.g. POS settlements[3], example POS Španski-Oranice), but also complexes of buildings (so-called new construction) built as new residential locations with densely built buildings without planned incorporated supporting infrastructure (e.g. in Zagreb Lanište-Jaruščica or in Split Kila) (Picture 1) (Svirčić Gotovac and Đokić, 2023: 17).
The largest share of new housing construction thus occurs through integration into existing and older estates and is characterized by random construction. New housing construction is mainly of the private type and is built either on the site of cheap plots on the outskirts of the city or instead of existing old houses that are purchased and demolished and then replaced with new residential buildings in the city zones which leads to a state of overuse of older estates. (Svirčić Gotovac and Đokić, 2023: 17). We can thus state that the post-socialist estates have inadequate and insufficient public infrastructure.

3. BENEFITS OF GREEN INFRASTRUCTURE AND ITS IMPLEMENTATION IN URBAN AREAS

Sustainable housing, a key element of sustainable development, focuses on protecting natural resources while creating efficient, high-performance homes and urban neighbourhoods. Its goal is to meet residents' needs, improve quality of life, safety, health, and overall satisfaction, and make neighbourhoods more attractive. It also aims to preserve and enhance local and regional nature, green spaces, and the economic and social environment in both the short and long term (Abdou 2013).
Access to urban green areas significantly enhances housing satisfaction and provides health benefits by promoting physical activity, reducing stress, and supporting psychological well-being. Green spaces serve as social hubs, fostering a sense of peace, safety, and belonging while reducing stress (Hartig 2008; Grahn and Stigsdotter 2010, Woo et al. 2009). Conversely, limited access to parks diminishes opportunities for social and physical activities, adversely affecting well-being and increasing health risks (Hartig 2008; Grahn and Stigsdotter 2010).
Uncoordinated urbanisation driven by economic growth harms the natural environment, exacerbating environmental issues and creating significant challenges for sustainable urban development. The integration of green infrastructures (GIs) into planning in many European regions remains underdeveloped (De Montis et al. 2021). However, the ecological dimension of neighbourhood satisfaction is gaining importance, driven by the sustainability paradigm. Agenda 2030, adopted by the UN in 2015, outlines 17 sustainability goals across six areas: justice and social cohesion, liveable cities, urban environments, spatial development, urban economy, and urban ecology, along with basic services and housing.

3 The Socially Supported Housing Construction (POS Program) was initiated by the state with the aim of addressing citizens' housing needs under conditions more favorable than those offered on the open market.

Green infrastructure (GI) provides diverse benefits, including environmental, social, and climate adaptation advantages. It enhances ecosystem resilience, conserves biodiversity by connecting natural areas, and prevents habitat fragmentation (Schäffler and Swilling 2013). Socially, GI offers multifunctional outdoor spaces, promotes safe and active environments, protects landscapes and natural heritage, strengthens local identity, and encourages community involvement in environmental actions.

Cities increasingly face challenges from unsustainable urbanisation, environmental degradation, climate change, and disaster risks. Green infrastructure (GI), particularly urban green infrastructure (UGI), plays a key role in addressing these issues. Although the concept and classifications of GI are evolving and vary, its implementation is expanding in Europe, supported by the EU's Green Infrastructure strategy (European Commission 2013; European Commission 2019).

The main barriers to developing green infrastructure (GI) include conflicting stakeholder interests, physical obstacles in private areas, and institutional challenges. Institutional barriers are particularly significant, affecting the availability, accessibility, and attractiveness of GI (Biernacka and Kronenberg 2018). These barriers range from legislation issues to a lack of cooperation, knowledge, and awareness, as well as poor communication among stakeholders. GI plays both a social role, fostering community, and an ecological role, based on the unique qualities of each neighbourhood (Al-Hagla 2008). These roles are interconnected and influence broader public space policies.

Garmendia et al. (2016) emphasise the need for functional connectivity between policy planners, developers, and various disciplines. A crucial aspect is involving citizens and residents in urban planning, especially regarding their immediate environment. However, in post-socialist countries, where citizen participation is typically low, this involvement is often insufficient or absent (Sviržić Gotovac et al. 2021b).

4. GREEN INFRASTRUCTURE AND GI STRATEGIES IN CROATIA IN THE SOCIALIST AND POST-SOCIALIST CONTEXT

Estates built during the socialist period shared common features due to the social context of that time. With a mixed planned and market economy and political priorities over economic ones, urbanisation was viewed as a sign of progress. The first large housing estates focused on meeting the needs of the working class, often located on the outskirts of cities. These estates, sometimes called "dormitories," were designed to be self-contained with cultural and recreational facilities in nearby centres. They were marked by monofunctionality, social homogeneity, and ecological and locational advantages, though these benefits were not always the result of thoughtful architectural or urban planning (Vujović 2014).

During the socialist period, environmental quality was officially viewed as an important aspect of life standards, though this was mostly at a declarative level. For example, in 1973, the Yugoslav Council for the Protection and Improvement of Human Environment proposed an initiative that led to the inclusion of the right to a healthy living

environment in the Yugoslav Constitution (Oštrić 1992). However, in practice, growth restrictions were seen as reactionary, and environmental protection regulations were often avoided.

Socialist-era large estates often included "green areas," "open city spaces," or "city greenery," valued for their ecological, recreational, and health benefits. However, compared to Western European park and landscape architecture, the planning and political oversight in socialist countries was weak or absent. The implementation of green spaces was mostly driven by quantitative criteria, such as the amount of green space per resident. Despite being broadly defined, these areas have become an ecological asset, which is notably lacking in newer post-socialist estates.

The post-socialist context of Croatia is shaped by intensive privatisation, particularly the mass privatisation of state-owned apartments in the 1990s. This shift resulted in a high rate of home ownership but insufficient maintenance of aging buildings and shared spaces (Svirčić Gotovac et al. 2021a). Market urbanism, driven by private entrepreneurial dominance, emerged as a key characteristic, often at the expense of public sector interests. Rapid privatisation hindered the development of sustainable social housing policies and led to the creation of unfinished housing estates lacking essential infrastructure, such as schools, kindergartens, and green spaces. These deficiencies have negatively impacted ecological well-being, community cohesion, and the quality of life, while failing to provide multifunctional spaces for recreation and aesthetics, ultimately affecting residents' physical and social environments (Gašparović and Jukić 2022).

Housing privatisation will lead to a wide range of consequences beyond the economic sphere, particularly affecting social dynamics, quality of life, housing standards, and even prompting demographic shifts. (Svirčić Gotovac, 2020).

Both older and newer residential estates in Croatia are increasingly recognised as needing renewal and revitalisation. The Green Infrastructure Development Programme in Urban areas, 2021–2030 (Ministry of Physical Planning, Construction and State Assets, 2021), plays a central role in this process, aligning with the European Green Deal and national strategies. It supports sustainable housing renovation by promoting GI, Nature-based Solutions (NbS), energy efficiency, climate adaptation, and circular spatial and building management (Svirčić Gotovac et al. 2021a). At the local level, the City of Zagreb's Green Infrastructure Strategy (2020) provides a governance framework for implementing these principles, addressing issues like urban pollution, public space degradation, loss of permeable areas, and climate resilience.

GI is embedded in multiple national laws and policy frameworks, including the Law on Spatial Planning (OG 153/13, 65/17, 114/18, 39/19, 98/19, 67/23) [4] and the Construction Act (OG 153/13, 20/17, 39/19, 125/19), which mandates the creation of a

4 "Green infrastructure includes planned green and water surfaces and other nature-based spatial solutions applied within cities and municipalities that contribute to the conservation, improvement and restoration of nature, natural functions and processes in order to achieve the environmental, economic and social benefits of sustainable development" (OG 39/19, Art. 1).

GI Development Programme for urban areas. These efforts are reinforced by broader strategies such as the National Development Strategy of Croatia until 2030 (2021), the Spatial Development Strategy, Long-term Strategy for the Renovation of the National Building Stock by 2050 (OG 140/20) and the Low-Carbon Development Strategy by 2030 with a view to 2050 (OG 63/21). Its importance is further highlighted by Croatia's Strategy for Adaptation to Climate Change (2020) and the Integrated National Energy and Climate Plan for 2021-2030 (2023). Overall, GI policy serves as a key enabler of urban renewal, linking housing revitalisation and residents' satisfaction with ecological conditions.

5. METHODOLOGY

Our research examines the ecological aspects and the way residents subjectively assess that dimension of their living and housing. We primarily examined residents' evaluation of the following ecological components of their neighbourhood: air and water quality, noise level (indicators of care for natural resources and safe environment), and satisfaction with maintenance, general cleanliness, and waste collection and removal in their neighbourhood. Then, we examined satisfaction with the green infrastructure and its (non-)existence in cities and settlements. Lastly, we looked at how public spaces could be improved and whether there were some specific problems in the neighbourhood that should be addressed.

The results on which we base this paper were collected as part of the scientific research project dealing with the quality of life in socialist and post-socialist estates in four Croatian cities, according to various aspects. In this research, the socialist estates imply large housing estates built up to the 1990s, whereby the socialist LHE are better equipped with green areas and public services, which makes them more desirable for living than the post-socialist ones, which are often overly built, lacking basic infrastructure, and suffering from a lack of public services, public institutions and absence of green areas (Svirčić Gotovac et al. 2023).

In our research, we set out two hypotheses:

1. There are significant differences among the four selected Croatian cities in residents' assessments of satisfaction with various ecological aspects of housing quality;
2. Satisfaction with the ecological aspects of housing quality varies depending on the construction period of residential estates, specifically distinguishing between socialist-era (older) and post-socialist (newer) developments.

The ecological aspects of housing quality constituted the central focus of this research. This paper presents the results of a questionnaire survey conducted in 2022 on a sample of adult respondents (N=1,536). The research was conducted in Zagreb and other regional centres. In littoral Croatia, those were Split and Rijeka, while in the northern, continental region of Croatia, it was the City of Osijek. In the selected estates, multistage probability sampling was implemented at the stages of: a) multi-family building entrance (i.e., street address), b) household within the building, and c) respondent in

the household, using the *random walk method* and the *last birthday method*. The survey was administered face-to-face, in a computer-assisted form (CAPI method)[5].

The sample of estates for Croatia included a total of 39 estates[6], of which 21 were old and 18 were new (of which 6 were POS estates). The number of respondents for each estate varied, but generally ranged from 40 to 55 residents in old estates, and from 25 to 40 residents in new housing estates. In all Croatian cities the share of residents of old estates was around 60% compared to those from new estates (around 35–40%), because even in real terms the share of old estates in the total housing stock is higher than the share of new estates or transitional and post-socialist housing construction. (all from: Sviržić Gotovac and Đokić, 2023:18)

Along with the questionnaire survey, focus groups were also conducted in two cities: in Zagreb from June to September 2022, and in Rijeka in June 2022. A total of 5 focus groups were conducted with 36 participants. We encountered challenges in recruiting participants for the focus groups. Although some individuals initially expressed interest in participating while completing the survey questionnaire, many later withdrew. As a result, we were only able to gather the views and experiences of residents from Zagreb and Rijeka. The focus groups encompassed residents of 4 (old) socialist and 15 (new) post-socialist estates[7]. A total of 13 male and 23 female interlocutors participated in the focus groups. The protocol for the conversation with the respondents was semi-structured. The focus groups lasted 90 minutes and were audio-recorded. The audio files were transcribed and analysed. The research results of the focus group method provided an added value to the interpretation of the questionnaire survey results and helped interpret insights related to ecological problems.

Thematic analysis (Kiger and Varpio 2020; Vaismoradi, Turunen and Bondas 2013) of the results of focus groups helped us in the interpretation. The themes were divided into the

5 The sample was disproportionate and took into account the size of each city. Specific neighborhoods in each of the four cities were purposefully selected based on the period of construction and the design of collective residential estates as urban and housing units. Furthermore, the sample was formed based on the size and geographical location of the settlements. For each city and individual neighborhood, quotas were established for the required number of residents.

In the second stage, sampling was conducted probabilistically at the level of households and participants, with the aim of ensuring representativeness in terms of gender and age. The applied methods included *the random walk method* for household selection and random selection of starting points in the sampling process (including random selection of floors and apartments, as well as the potential respondent, based on the rule of interviewing the household member who most recently had a birthday (Sviržić Gotovac and Đokić, 2023).

6 In Zagreb, the sample included 11 older and 9 newer neighborhoods (N=661); in Split, 5 older and 4 newer neighborhoods were included (N=371); in Rijeka, 3 older and 3 newer neighborhoods were included (N=253); and in Osijek, 2 older and 2 newer neighborhoods were included (N=251).

7 The following estates were encompassed: in Rijeka the following socialist estates: Gornja Drenova and Donja Drenova, Belvedere, Podmurvica, Kozala (Rijeka) (4), and in Zagreb the following socialist estates: Knežija, Savica, Travno, Sopot, Trnsko, Vrbani II, Dugave (7), and the post-socialist estates: Sopnica-Jelkovec-POS estate, Vrbani III, Selska-Baštijanova, Jaruščica-Lanište, Vukovarska-Radnička, Ravnice (new part), Španski-Oranice and Vrbik (new part) (8).

following categories: a) (dis)satisfaction with the ecological components (air, water, noise and waste removal) in four Croatian cities; b) (dis)satisfaction with the ecological components according to the type of estates (socialist or post-socialist estates); c) (dis)satisfaction with the life in socialist and post-socialist estates regarding the green infrastructure; and d) opportunities for improvement of existing public spaces and areas.

6. RESULTS AND DISCUSSION

6.1. (Dis)satisfaction with the ecological components in four Croatian cities

We asked the residents of Zagreb, Split, Rijeka and Osijek how (dis)satisfied with the quality of air, water, noise level and waste removal they are (Table 1). The results reveal that waste removal and the level of noise are among the most significant problems in Croatian cities. Residents are least dissatisfied with water quality, while air quality ranks somewhat higher.

Table 1: *Residents' satisfaction with urban-ecological conditions in Zagreb, Split, Rijeka and Osijek (%)*

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied	Total
Air quality	2.0	11.2	20.3	52.9	13.7	100
Water quality	2.7	8.3	15.4	55	18.6	100
Noise level	3.6	14.9	24.5	45.6	11.4	100
Waste/trash removal	10.9	20.7	27	32.9	8.5	100

Given that the explored cities (Zagreb, Split, Rijeka and Osijek) have different ecological, political and cultural, as well as other social features, we tested the relation between individual parameters of quality of life (air, water, noise and waste removal) and residents' (dis)satisfaction. According to the results that are statistically significant, satisfaction with air quality (Table 2) is mostly reported by residents of Rijeka and Split (cities on the Adriatic coast), and residents of Osijek, who are overall more satisfied with air quality than the residents of Zagreb ($\chi 2 = 89.009$, df=12, $p<.001$). It needs to be pointed out that the residents of Zagreb are more often than others unsure how to assess air quality, despite many problems they are facing with air quality.

Table 2: *Residents' satisfaction with air quality in Zagreb, Split, Rijeka and Osijek (%)*

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied	Total
Zagreb	3.2	13	26.5	46.4	10.9	100
Split	0.3	10.2	18.9	62.3	8.4	100

Rijeka	2.8	8.7	13.8	51.8	22.9	100
Osijek	0.4	10.4	12.7	57	19.5	100
Total	2	11.2	20.3	52.9	13.7	100

Water quality (Table 3) is mainly mostly assessed as satisfying by all residents of the Croatian cities. None of the residents of the Adriatic part of Croatia (Rijeka and Split) are very dissatisfied. Furthermore, a high percentage of Zagreb residents are neither satisfied, nor dissatisfied with water quality. Also, residents of Adriatic cities reported the highest satisfaction with water quality. Differences in water quality assessment are statistically significant ($\chi 2$= 108,268, df= 12, p< .001).

Table 3: *Residents' satisfaction with water quality in Zagreb, Split, Rijeka and Osijek (%)*

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied	Total
Zagreb	2.9	10.6	17.2	52.5	16.8	100
Split	0.5	6.2	15.4	66.6	11.3	100
Rijeka		3.2	12.6	52.2	32	100
Osijek	8	10.8	13.5	47.4	20.3	100
Total	2.7	8.3	15.4	55	18.6	100

The most dissatisfied with the noise level (Table 4) are the residents of the capital Zagreb and Rijeka. Osijek has the lowest number of the dissatisfied residents. The differences are statistically significant ($\chi 2$= 62.355, df=12, p< . 001).

Table 4: *Residents' satisfaction with noise level in Zagreb, Split, Rijeka and Osijek (%)*

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied	Total
Zagreb	5.7	19.2	25	40.2	9.8	100
Split	2.2	11.3	19.4	55	12.1	100
Rijeka	2	15.8	30	42.7	9.5	100
Osijek	1.6	8	25.5	48.6	16.3	100
Total	3.6	14.9	24.5	45.6	11.4	100

Residents' statements in focus groups have shown dissatisfaction of Zagreb residents with the ecological issues, primarily with air quality and noise level due to traffic and too many cars. In Zagreb, the congestion of large roads with cars is highlighted, and consequently a bad air quality.

"*The traffic is heavy and the air is terrible. Our values are up to ten times higher than allowed, because we are surrounded by Slavonska and Držićeva Avenues, where the traffic gets congested and pollutes the air most strongly."* (a male resident, Zagreb, Savica, socialist estate)

In Rijeka, the traffic problem is highlighted as well, i.e., the contamination and devastation of the space due to a large number of parking spaces that take away the space for other facilities, altogether resulting in large noise and air pollution. The interlocutor warns of excessive asphalting and insufficient green areas, which leads to the creation of heat islands in which the temperature is higher than in other city parts.

"This is something that annoys me very much, because it is in fact noise, it's contamination, it's spatial devastation, or occupation of areas by the parking spaces, which automatically takes away the space for other facilities. It's too much asphalt, which in turn causes the creation of heat islands and higher temperature of the whole city." (a male resident, Rijeka, Podmurvica, socialist estate)

At the national level the greatest problem is waste collection and waste removal. The most satisfied with it are the residents of Osijek, while the least satisfied are those from Zagreb (Table 5). The differences among the cities are statistically significant ($\chi 2$= 446.402, df= 12, p<.001).

Table 5: *Residents' satisfaction with waste/trash removal in Zagreb, Split, Rijeka, and Osijek (%)*

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied	Total
Zagreb	22.7	29	26.2	18.3	3.8	100
Split	3.2	22.6	34.8	34	5.4	100
Rijeka	1.6	13.4	30.4	45.8	8.7	100
Osijek	0.4	3.2	14.3	56.6	25.5	100
Total	10.9	20.7	27	32.9	8.5	100

In the focus groups the residents also highlight the problem of waste removal. In the post-socialist estates, the residents are dissatisfied with the regularity of waste removal, and a lack of waste disposal infrastructure

6.2. (Dis)satisfaction with ecological components according to the type of estates (socialist and post-socialist estates)

In this paper, we tested the hypothesis that there are differences in the quality of housing between socialist and post-socialist estates in Croatia.

Residents of the two types of estates mostly find that air quality (Table 6) is satisfactory or very satisfactory. Altogether, with regard to the period when the estates were built, the chi-square test did not show any statistically significant differences in the responses.

Table 6: Residents' satisfaction with air quality according to the time of construction of the estate (%)

Type of estate	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied	Total
Socialist (built until 1990)	2.3	11.1	18.4	54.7	13.4	100
Post-socialist (built after 1991)	1.4	11.3	23.5	49.7	14.1	100

Water quality (Table 7) is seen as satisfying or very satisfying by a great majority of residents in the estates. However, there is an evidently higher dissatisfaction with water quality in the socialist estates ($\chi 2= 16.426$, df=4, p<.001). Concerning the age of the estate and deterioration of installations in the buildings and on main pipelines, it is reasonably certain that the residents of particular older estates are not satisfied with water quality, which is proven by relatively frequent incidents, e.g., in Zagreb (Jurdana 2022).

Table 7: *Residents' satisfaction with water quality according to the time of construction of the estate (%)*

Type of estate	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied	Total
Socialist (built until 1990)	1.5	8.3	16	56.4	17.8	100
Post-socialist (built after 1991)	4.7	8.3	14.4	35.9	40	100

Noise in the estates of large cities is perceived as a greater problem than air and water quality (Table 8). More dissatisfied are the residents in the socialist estates, while those living in post-socialist estates prevail among the undecided ($\chi 2= 13.859$, df=4, p< .01).

Table 8: Noise level according to the time of construction of the estate (%)

Type of estate	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied	Total
Socialist (built until 1990)	3	17	23.1	46.4	10.5	100
Post-socialist (built after 1991)	4.5	11.5	27	44.2	12.9	100

Residents of the socialist and post-socialist estates see waste removal as the biggest problem in Croatian cities (Table 9). A higher share of those who are undecided and moder-

ately or very dissatisfied with the dynamic of waste removal is evident among residents of the socialist estates. These differences are statistically significant ($\chi 2 = 22.376$, df=4, $p < .001$).

Table 9: *Residents' satisfaction with waste removal according to the time of construction of the estate (%)*

Type of estate	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied	Total
Socialist (built until 1990)	12.3	21.9	25	30.7	10.2	100
Post-socialist (built after 1991)	8.5	18.8	30.4	36.5	5.7	100

When interpreting these results, it is important to consider the broader political and social context—particularly in the Croatian capital, Zagreb, where waste management has emerged as a highly politicised issue. The opposition, currently governing the city, has sought to assert its effectiveness by introducing new waste disposal and collection models. As part of these reforms, residents are required to purchase standardised bin bags and to separate mixed, plastic, and bio-waste—practices that were largely unfamiliar to the majority and remain inconsistently followed, despite the introduction of penalties. Although city authorities have attempted to enforce compliance through public warnings and pressure, these efforts have thus far yielded limited success.

6.3. Satisfaction with the life in socialist and post-socialist estates with regard to the green infrastructure

Regarding the question whether the estates meet all the criteria for comfortable living of the residents, the results confirm that the great majority is satisfied with the estate in which they live, and in this sense, there were no statistically significant differences (Table 10).

Table 10: *Residents' satisfaction with life in the neighborhood (%)*

Type of estate	I do not agree at all	I disagree	I neither agree nor desagree	I agree	I completely agree	Total
Socialist (built until 1990)	0.9	4	18.2	59.3	17.6	100
Post-socialist (built after 1991)	2.3	2.6	15.8	59.1	20.2	100

The results referring to the question of whether there are enough green areas in the estate where they live, confirm a difference between the socialist and post-socialist estates

(Table 11), where the residents of the post-socialist estates report dissatisfaction with the quantity of green areas ($\chi 2$= 30,799, df=4, p<.001

Table 11: *Residents' satisfaction with green areas (%)*

Type of estate	I do not agree at all	I disagree	I neither agree nor desagree	I agree	I completely agree	Total
Socialist (built until 1990)	1.6	11	18.5	47	21.9	100
Post-socialist (built after 1991)	4.3	13.7	23.5	44.9	13.6	100

Regarding the focus groups and the respondents' answers on the presence of green areas, the residents of the socialist estates emphasise their satisfaction with the green areas in their neighbourhood, both in the Zagreb estates, as well as those in Rijeka and Osijek (Picture 2). This includes children's playgrounds, and green areas in front of the buildings.

Picture 2.

Osijek: Sjenjak- a positive example of an old estate with sufficient infrastructure and enough green areas
Source: Sviršić Gotovac and Đokić, 2023: 129

What residents like and highly value in neighborhoods is illustrated by the following quote from a resident from the Zagreb neighborhood of Trnsko.

"In Trnsko it is perfect, separated by the gorgeous Park of the Newlyweds, planted by our parents—this was an obligation for every married couple to pay for the planting of one tree before getting married. The park is beautiful and well-maintained, with many old trees, and new ones being planted. There is a small lane with exercise equipment, it's great for a walk and we have a dog park which is equipped very well." (a female resident, Zagreb, Trnsko, socialist estate)

In the focus groups, the residents point out the concrete surfaces and a lack of greenery, which negatively affect the quality of life of the residents in post-socialist estates (Picture 3)

"Over there, there is a block-on-block situation, and the asphalt is so heated it could 'kill you'. So, the temperatures are extremely high. Simply put, there is no air, because it's all concrete." (a male resident, Zagreb, Novi Jelkovec, post-socialist estate)

Public (green) areas like children's parks are sometimes tended only after tenants' initiatives, pointing to the need to acknowledge local communities' opinions. In many cases, citizens react to the attempts of the authorities to reduce the green areas, and enter the so-called reactive participation (Svirčić Gotovac et al. 2021b), which is one of the ways of reacting to the public authorities' decisions or their lack of response to citizens' requests.

Picture 3.

Zagreb: Lanište- Jaruščica – a negative example of new estate with insufficient infrastructure and without green areas

Source: Svirčić Gotovac and Đokić, 2023: 122

"The buildings organised themselves and tended parks for children, but those are smaller parks." (female resident, Zagreb, Jaruščica, post-socialist estate)

In the building of socialist estates, more attention has been given to the urban planning aspects of incorporating public green spaces into the building of estates. The immediate ecological and living environment in large housing estates was an integral part of the planning of the quality of life.

6.4. Opportunities for the improvement of existing public spaces and surfaces

Furthermore, we surveyed residents' opinions regarding the opportunities to improve the layout of estates across various aspects (Table 12). It can be said that greening, i.e., creating new parks, planting trees and maintaining green areas, is high on the list of residents' preferences. In addition, the importance of greenery and its maintenance is more often mentioned by the residents of the post-socialist estates ($\chi 2 = 44.071$, df=9, $p<.001$). These residents also highlight the importance of investing in public space equipment. The need for investing in the greening of surfaces is much less highlighted by the residents of the socialist estates, who are equally as convinced as the residents of the post-socialist estates that it is necessary to invest in public space equipment. In both groups of residents, there is a need for sports facilities, and in the socialist estates, there is also a need for spaces to socialise, since these estates are mostly built without accompanying commercial facilities for socialising (cafés, restaurants, clubs, etc.).

Table 12: Improvement of existing public spaces and surfaces (%)

	Socialist (built until 1990)	Post-socialist (built after 1991)
Improvement of equipment for public spaces (benches, exercise equipment, etc.)	28.8	26.6
Greening (building new parks, planting new trees, tree rows, etc.)	28.4	40.3
Larger space for recreation and sports	11.1	7.5
Larger space for gathering/hanging out	8.2	5.9
More playgrounds for children	3.7	3.5
Better maintenance and cleaning of existing public areas	9.3	7.7
Reorganization and reduction of car traffic and parking	2.5	5
A greater number of bicycle paths	1	0.5
Something else	2.5	1.6
I do not know/do not want to answer	4.4	1.4
Total	100	100

7. CONCLUDING REMARKS

The concept of GI and urban planning is still not fully recognised and faces many challenges, including the integration into the planning process. Research suggests that many estates built during the post-socialist period may have relatively limited green areas, potentially due to insufficient planning and prevailing market conditions at the time (Dekker et al. 2004; Dekker et al. 2006; Hess et al. 2018; Jukić et al. 2011). However, the extent of these deficiencies can vary depending on local policies, urban development strategies, and specific site conditions. In many post-socialist countries, the limited provision of GI poses significant challenges for residents, particularly given the well-documented social, ecological, and health-related benefits associated with green space at the local level. This issue is especially pronounced in newly developed estates, which are frequently constructed in peripheral urban areas and rely heavily on the existing infrastructure of adjacent socialist-era developments. These newer estates often lack adequate GI, a shortfall largely driven by socio-political dynamics that prioritises market-oriented approaches and entrepreneurial initiatives over long-term spatial and environmental planning. As a result, economic imperatives tend to override considerations of spatial quality, leading to urban environments that may fall short of supporting residents' well-being and overall quality of life. "Mega-city transformation in the post and transitional socialist countries suffers from urban greenness challenges, which affect people's quality of life." (Wu et al. 2020:1). On the other hand, the transition to a market-oriented housing market has also created new opportunities of residential preference and lifted the costs of access to parks that were previously ignored by the socialist quota-based housing allocation system (Wang 2004; Jukić et al. 2010; Vujović 2014; Sviršić Gotovac et al. 2020).

Our results confirm both hypotheses: there are differences in satisfaction with various ecological aspects of housing in cities, and there is a difference in satisfaction with the ecological aspects of housing regarding the period in which the estate was built. Seen from the perspectives of all the cities, our research shows that, on a general level, residents are satisfied with life in the cities they live in, and there are no significant differences in that regard.

However, when examining individual ecological aspects, residents of the Adriatic cities and Osijek report higher levels of satisfaction with ecological factors (such as water quality, air quality, waste disposal, and noise), with the exception of Rijeka, where noise is noted as a problem.

Zagreb stands out as the most problematic city in this regard, particularly with respect to waste disposal, noise, and water quality. When it comes to air quality, Zagreb's residents were the most uncertain compared to those in other cities about how to assess it.

Regarding satisfaction with green infrastructure, residents of socialist housing estates reported the highest levels of satisfaction. Moreover, when considering potential improvements in their neighbourhoods, residents of socialist estates would invest primarily in improvement of the equipment for public spaces, while residents of post-so-

cialist estates indicated they would invest most heavily in green infrastructure. It is evident that residents of socialist and post-socialist estates have differently structured priorities.

Our research also shows that the key problems were related to the ecological aspects that could be resolved by urban planning. During the construction of socialist-era housing estates, both urban planning principles and the provision of public and green spaces were addressed at the level of the entire residential estate (Jukić et al. 2010; Jukić et al. 2011), while the same was not the case in the building of the post-socialist estates. The latter creates discontent among the residents, due to a large number of concrete and parking surfaces, having a negative impact on the environment and the quality of life. The greatest problem at all levels (city and estate) appears to be noise and waste collection. The level of noise is more often a source of complaint among residents of the estates in Zagreb and Rijeka, which is above all the result of too much traffic and its unsystematic regulation. The problem of waste removal is particularly strong in Zagreb, in which the problem of infrastructure for waste collection is not resolved, which contributes to the contamination of public, mostly green surfaces, where waste is collected. When assessing the availability of green surfaces, residents of post-socialist estates are more dissatisfied. In the post-socialist estates, green areas, such as children's parks, are sometimes tended only upon residents' initiatives. This points to both the great and important role of residents trying to impact the layout of their estates, and to the smaller or occasional concern of the authorities for implementing green surfaces into post-socialist estates.

Residents of the socialist estates emphasise satisfaction with the presence of green surfaces in their neighbourhood, both in the estates in Zagreb and Rijeka. This includes children's parks and green areas in front of the buildings. The latter points to a conclusion that older estates were urbanistically much better designed. In terms of the opportunities for improvement of the estates and the measures that should be undertaken, residents most often suggest greening, or the creation of new parks, upgrading existing public spaces and reducing traffic, as well as constructing parking facilities. In the 2015 research, it was also shown that the suggestions for the improvement of the neighbourhood were similar (Zlatar 2015).

Finally, if we ask ourselves why Croatian settlements are not greener, we can infer that the authorities are predominantly focused on those green areas for which they are responsible, but we can also point to a widespread lack of interest for green surfaces that do not yield immediate profit, especially to investors, i.e., economic agents that have a major role in city planning in post-socialist countries.

Civic participation and the influence of all types of agents are thus seen as key factors in further planning and implementation of GI, and also of other elements important to the quality of life in the estate. The active involvement of urban planners, designers and ecologists is also essential to articulate strategies for urban green space that explicitly advance public health and environmental equity in urban communities (Wolch et al. 2014).

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ČIME SU GRAĐANI ZADOVOLJNI? EKOLOŠKI ASPEKTI ZADOVOLJSTVA SUSJEDSTVA U HRVATSKIM GRADOVIMA U SOCIJALISTIČKIM I POSTSOCIJALISTIČKIM NASELJIMA

Sažetak

Zadovoljstvo stanovanjem jedna je od dimenzija kvalitete života koja se ispituje u vezi s percepcijom zadovoljstva životom u urbanim područjima te se smatra indikatorom kvalitete stambenih politika. Koncept zadovoljstva životom danas pogotovo uključuje ekološke osobine okruženja. U ovom radu ispituju se ekološki aspekti zadovoljstva života u velikim gradovima Hrvatske (Zagreb, Split, Rijeka, Osijek) kao i ekološki aspekti zadovoljstva života u large housing estates (LHE) izgrađenima u socijalističkom i post-socijalističkom razdoblju. Istraživanje je provedeno mješovitom metodologijom; anketom na uzorku od N=1536 stanovnika te metodom fokusnih grupa sa stanarima iz socijalističkih i post-socijalističkih naselja. Rezultati pokazuju kako su stanovnici gradova i naselja najzadovoljniji prirodnim resursima odnosno kvalitetom vode i zraka, manje zadovoljni razinom buke, a najmanje zadovoljni načinom odlaganja i odvožnje otpada. U tom pogledu postoje značajne statističke razlike među gradovima kao i naseljima s obzirom na razdoblje izgradnje. Što se tiče zelene infrastrukture pokazuje se da su uslijed neplaniranja te tržišnih okolnosti izgradnje post-socijalistička naselja deficitarna zelenilom, a da stanovnici svih naselja smatraju kako je ozelenjavanje okoliša prioritet zbog klimatskih promjena ali i kvalitete života u njima.

Ključne riječi: *ekološki aspekti, zelena infrastruktura, post-socijalistička naselja, socijalistička naselja, urbano planiranje*

WAS MACHT BÜRGER ZUFRIEDEN? ÖKOLOGISCHE ASPEKTE DER NACHBARSCHAFTSZUFRIEDENHEIT IN KROATISCHEN STÄDTEN IN SOZIALISTISCHEN UND POSTSOZIALISTISCHEN GROßWOHNSIEDLUNGEN

Zusammenfassung

Die Nachbarschaftszufriedenheit ist eine der Dimensionen der Lebensqualität. Sie wird im Zusammenhang mit der Wahrnehmung der Lebenszufriedenheit in städtischen Gebieten untersucht und als Indikator für die Qualität der Wohnungspolitik betrachtet. Insbesondere heute umfasst das Konzept der Lebenszufriedenheit auch ökologische Merkmale der Umwelt. Dieser Beitrag untersucht die ökologischen Aspekte der Lebenszufriedenheit in großen kroatischen Städten (Zagreb, Split, Rijeka, Osijek) und die ökologischen Aspekte der Lebenszufriedenheit in großen Wohnsiedlungen (GWS), die sowohl in der sozialistischen als auch in der postsozialistischen Zeit gebaut wurden. Die Untersuchung wurde unter Verwendung einer Mixed Methodology durchgeführt; der Fragebogen wurde an einer Stichprobe von N=1.536 Einwohnern angewendet, und es wurden Fokusgruppen mit Bewohnern sozialistischer und postsozialistischer Wohnsiedlungen durchgeführt. Die Ergebnisse zeigen, dass die Bewohner der Städte und Wohnsiedlungen mit den natürlichen Ressourcen, d. h. der Wasser- und Luftqualität, am zufriedensten sind, weniger zufrieden mit dem Lärmpegel und am wenigsten zufrieden mit der Art und Weise, wie Abfall entsorgt und beseitigt wird. In dieser Hinsicht gibt es statistisch signifikante Unterschiede zwischen den Städten sowie zwischen den Wohnsiedlungen in Bezug auf den Zeitraum, in dem sie gebaut wurden. Hinsichtlich der grünen Infrastruktur haben frühere Untersuchungen gezeigt, dass aufgrund mangelnder Planung und der Marktbedingungen des postsozialistischen Bauens Wohnsiedlungen aus dieser Zeit über unzureichende Grünflächen verfügen. Darüber hinaus sind die Bewohner aller Wohnsiedlungen der Meinung, dass die Begrünung der

Umgebung aufgrund des Klimawandels, aber auch zur Sicherung der Lebensqualität in den Siedlungen eine Priorität darstellt.

Schlüsselwörter: *ökologische Aspekte, grüne Infrastruktur, postsozialistische Siedlungen, sozialistische Siedlungen, Stadtplanung*