TRANSFORMATION OF GARDEN SETTLEMENTS INTO A RESIDENTIAL ZONE

Sofie Pokorná, Vítězslava Hlavinková
Institute of Forensic Engineering, Brno University of Technology, Purkyňova 464/118, 612 00 Brno, Czechia

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Abstract
The content of this paper is research on gardening settlements. These are special urban areas that, as recreational spaces for city residents, contribute to the maintenance of their mental and physical condition. At the same time, from the point of view of environmental and ecological urbanism, they are a specific ecosystem of so-called green infrastructure, whose importance is seen, for example, in the prevention of overheating in urban areas in the summer months. At the same time, the economic aspect cannot be overlooked, namely the savings in the city budget for the maintenance of greenery. For the purpose of this research, the gardening settlements in Brno were monitored. The paper deals with the gradual transformation of these settlements into residential space. It analyses the economic factors and looks for parallels in the construction of emergency colonies in the 1920s in Brno. The article draws attention to the disruption of the local ecosystem and its transformation, the disappearance of the recreational zone and the benefits of urban green infrastructure.

Key words: Recreation zones, green urban islands, shanty town, Brno

Introduction

Garden settlements are a traditional part of the Czech urban space. They have social, psychological, environmental, and economic significance for the whole society living in cities.
Ecological urbanism mainly addresses the type and percentage of green space and water features (Ostarek 2021). It aims at sustainable urban development and building healthy and functional settlements. Green islands (isolated green areas) and whole green infrastructure (connected green spaces) are important in reducing the temperature of urban areas during the summer months and preventing so-called heat islands. For example, a study from China shows that unshaded areas reach up to twice the temperature of shaded areas. Shading urban areas with green space is also of high importance in terms of protection against noise, dust, and emissions (Yang et al. 2021). Research in Brno on green spaces and water areas has also shown that these areas have the potential to improve the urban climate (Kliment et al. 2022).
The planning of functional cities is undoubtedly related to a healthy society and the influence of green spaces on the human psyche. Appropriate use of green space within urban space has a safe, optimistic, and calming effect on people. At the same time, they are largely areas for recreation and leisure activities. Gardening settlements are areas for individual recreation that provide their users with the opportunity for active recreation and partial food self-sufficiency.
Green infrastructure is also important for biodiversity. A 2007 article by Czech scientists points out that elevated temperature, imises, the proportion of calcium in buildings and readily available food sources cause high biodiversity for certain groups of organisms (Švecová et al. 2007). Areas of green infrastructure, which provide similar conditions for the life of individual species as their natural habitats, show the highest organic diversity (Benedikt, McMahon 2001). These benefits of green space can be applied to the gardening settlements that were established en masse in the Czech Republic after World War II (Klika et al. 2020).
It is worth pointing out that this article does not take into account the transport solutions of cities or their urban design as a dynamic whole.

Material and methods

This article aims to highlight the importance of garden settlements from a social, environmental, and economic perspective. It supports the gradual transformation from individual recreational zones to residential zones with research data and uses this data to find parallels in the construction of the emergency colonies of the 1920s. The primary source for the analysis of the current situation was data obtained from the publicly available part of the Land Registry (hereinafter KN). In a survey of several garden colonies, it was found that there are 3 basic types of existence of buildings:
- Structures not registered in the KN and traceable only on orthophotos (Fig. 1)
- Building not registered in the KN but with a plot of land
- Building registered in the KN with a evidencional number (hereinafter referred to as ev. no.)

Comparison of the map parts of the current and future master plan allowed the authors to clearly quantify the transformation of garden settlements.

Fig. 1: Traceability of unregistered buildings - see red framed plots (cuzk.cz)

More detailed research was carried out in the localities of Velká and Malá Bosně (c.t. Medlánky), Výšiny (c.t. Jundrov), Travní (c.t. Nový Lískovec), Rakovec (c.t. Bystrc).

Tab. 1: Garden settlements in urban areas (gis.brno.cz)

Garden settlements in urban districts	Area [m^2]	Surveyed area [m^2]
Líšeň: u ul. Jateční, nad Mariánským údolím, u Kostelíčka, u Zetoru	259 597	
Slatina: Stránská skála	98 734	
Židenice: JZ svah Vinohradského kopce, mezi ul. Rokytova a Kuldova	352 300	
Maloměřice: ul. Hády, ul. Podzimní	318 709	
Obřany: na východní a západní hranici městské části	746 238	
Sadová	579 328	
Brněnské Ivanovice	61 213	
Černovice	154 452	
Nový Lískovec: Travní	**284 064**	**126 632**
Bosonohy	408 870	
Žebětín	378 792	
Jundrov: Výšiny	**281 391**	**281 391**
Bystrc: Kamechy, západní břeh přehrady	**652 952**	**154 000**
Kníničky	39 793	
Komín	462 213	
Medlánky: Velká Bosně, Malá Bosně, kolem letiště	**293 677**	**56 042**
Královo Pole	435 149	
Řečkovice	90 710	
Ivanovice	158 051	
Total areas	**6 056 233**	**618 065**

For the selected surveyed areas, it was found that there are 28 recreational facilities with registered permanent residence on the area of 618 065 m^2 (Tab. 1). Based on a generalisation of this data, it can be assumed that there are at least 274 officially permanently inhabited recreational buildings in all the garden settlements of Brno. The areas did not include garden settlements which still exist, but were already in the buildable areas in the 1994 Master Plan, e.g., garden settlement on Žlutý Kopec.
The City Budget states: "We have allocated 27.6 million for the maintenance of green areas for 2022. CZK" (source: Press release: Municipal district Brno-central). Based on this input, the potential savings in public finances are calculated.

Results

A survey of the impact of the existence of functional garden settlements on the city budget is quantified in Tab. 2. This is a potential saving, where the costs approved for the maintenance of the green space in Brno-Central for 2022 are put into proportion with the area of green space maintained by this urban district. As the maintenance requirements for green areas in the centres are generally higher, this amount has been proportionally reduced to 1/3 for green areas outside the centre. The reduced amount was multiplied by the approximate area of the garden settlements and the potential savings of over 62 million CZK were calculated. Approximately this amount would have to be spent if the town had maintained the allotments itself as green areas.

Tab. 2: Potential savings of the City of Brno due to recreational activities of gardeners

Brno-city	Area [m^2]	Cost [Kč]
Greenery in Brno - centre	859 306	26 700 000
Cost per 1 m^2/year 2022 in the centre of Brno		31,07
Theoretical cost per 1 m^2/year outside the centre of Brno		10,36
Approximate area of garden settlements	6 056 233	
Potential savings		62 725 588

For research on the gradual transformation of garden settlements, spatial planning documentation is a suitable basis. The approval of the draft of the new master plan was preceded by debates over the various options – some areas of the garden settlements were newly allocated for predominantly residential development (Klika et al. 2020). The most significant change was in the Kohoutovice/Jundrov area, however, as can be seen in Fig. 2, the plan has been reconsidered. In 2022, the Final Draft of the Master Plan was published.

Fig. 2: Draft Local Plan for Kohoutovice/Jundrov from 2020 and Final Draft Local Plan from 2022 (gis.Brno.cz)

In the introduction, the benefits of greenery on the city's climate were mentioned. It is clear from Fig. 3 that wooded areas and the Svratka River reach significantly lower temperatures than paved and built-up areas, e.g. the Pisárky depot (bottom right corner).

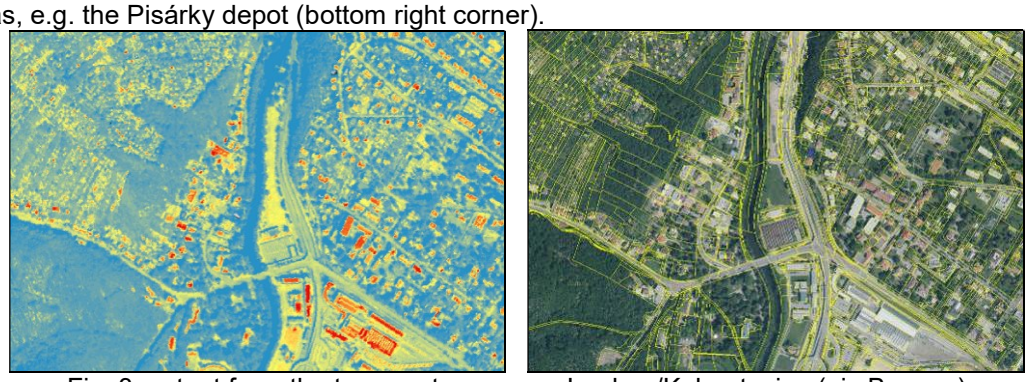

Fig. 3: cutout from the temperature map - Jundrov/Kohoutovice (gis.Brno.cz)

Discussion

Given the poor accessibility of individual plots in the garden settlements, their lower standard of accommodation and their remoteness from other residential buildings, it is possible to find a parallel between the former shanty towns that were established in the 1920s in the city of Brno. These were slum buildings in the basic formula of "kitchen + room", which were built mainly from bricks recovered from demolition sites. The buildings were characterised by a great variety of materials. This

heterogeneity of materials can be noticed when walking through the garden settlements. Another parallel is the economic situation of the inhabitants of the emergency colonies and garden settlements. Whereas historically it was an economic crisis that led to companies cutting jobs or reducing hours, today it is an economic crisis caused by high inflation and soaring energy prices. The number of people below the poverty line then and now has increased exponentially.
The clear advantage of allotments is the improvement of the microclimate, but all the above-mentioned positives are conditional on land users respecting the rules and the landscape. Otherwise, uncontrolled development can occur, and the lack of reseeding (absence of sewerage) leads to a change in soil composition.

Conclusion
Garden settlements have long been a part of Czech cities and the new Brno city plan shows that this will be no different in the future. Thanks to orthophoto images in the KN, a higher number of buildings that are not registered is visible, surprisingly even on land owned by the Statutory City of Brno. The benefits of functional garden settlements from the point of view of the municipal budget are the low economic cost of maintenance of green areas that improve the urban climate and, from the point of view of biodiversity, the existence of wild areas that are absent in urban parks. An unpleasant reality is that, despite the existence of scientific studies, the recommendations of experts are very slow to be put into practice.

References
Ostarek M., (2021). Environmental urbanism and sustainable cities. IOP Conference Series: Earth and Environmental Science, 900 012031.
Yang Z., Chen Y., Wu Z., (2021). How urban expansion affects the thermal environment? A study of the impact of natural cities on the thermal field value and footprint of thermal environment Ecological Indicators 126 107632.
Kliment, D., Pokorná, S., & Doležalová, M. (2022). Factors of the urban space supporting recreation and their influence on the environment. Proceedings of the 13th Conference (pp. 137-141). Mendel University in Brno.
Švecová, M., Smrž J., Petr J. (2007): Biodiverzita a udržitelný rozvoj. Klub ekologické výchovy, Praha, 70 s.
Benedict, M., A., McMahon, E., T. (2001): Green Infrastructure: Smart Conservation for the 21st Century. Dostupné online: < http://www.sactree.org/assets/files/greenprint/toolkit/b/greenInfrastructure.pdf>
Klika, P., Hlavinková, V., & Vařechová, M. (2020). Where did gardens go?. In *Public recreation and landscape protection – with sense hand in hand?* (pp. 576-580). Mendel University in Brno.
Nahlížení do katastru nemovitostí. (2023). ČÚZK. Retrieved April 10, 2023, from https://nahlizenidokn.cuzk.cz/
Mapový portál města Brna. (2023). Retrieved April 10, 2023, from https://gis.brno.cz/
TISKOVÁ ZPRÁVA Brno-střed má schválený rozpočet pro rok 2022. (2021). Městská část Brno - střed.

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Souhrn
Zahrádkářské osady mají význam sociální, psychologický, enviromentální i ekonomický. Jedná se o plochy pro individuální rekreaci, které poskytují svým uživatelům možnost aktivního odpočinku a částečné potravinové soběstačnosti.
Zelená infrastruktura je důležitá i z hlediska biologického, a to zejména s ohledem na biodiverzitu.
Výzkum postupné transformace individuálních rekreačních zón v residenční je doložen daty z veřejně dostupných zdrojů a na jejich základě hledá paralely ve výstavbě nouzových koloniích 20. let 20. století a zamýšlí se nad dopady jejich zániku. Při průzkumu několika zahrádkářských osad bylo zjištěno, že jejich součástí jsou stavby neevidované v KN a dohledatelné jen na ortofoto snímcích, stavba neevidovaná v KN ale s vyčleněnou stavební parcelou a stavby evidované v KN s evidenčním číslem.Detailnější výzkum proběhl v lokalitách Velká a Malá Bosně, Výšiny, Travní, Rakovec.
Pro vybraná zkoumaná území bylo zjištěno, že na ploše 618 065 m^2 se vyskytuje 28 rekreačních objektů s evidovaným trvalým bydlištěm. Na základě zobecnění tohoto údaje lze předpokládat, že ve všech zahrádkářských osadách města Brna se nachází minimálně 274 oficiálně trvale obydlených

rekreačních objektů. Pro posouzení vývoje zahrádkářských osad je vhodným podkladem územně plánovací dokumentace, která se také transformuje.
Ekonomické hledisko výzkumu ukázalo potenciální úsporu v rozpočtu města Brna na údržbu zeleně. Na základě údaje o schválených nákladech na údržbu zeleně v Brně - střed pro rok 2022 byla vyčíslena potenciální úspora cca 62 mil. Kč. Mezi zahrádkářskými osadami a nouzovými koloniemi z 20. let 20. století lze nalézt paralelu. Stavby v nouzových koloniích se vyznačovaly velkou materiálovou různorodostí obdobně jako chatky zahrádkářských osad. Další paralelou je ekonomická situace obyvatel nouzových kolonií a zahrádkářských osad. V historii i dnes ekonomická krize způsobila skokový nárůst lidí ocitajících se pod hranicí chudoby.

Contact:
Ing. Sofie Pokorná
E-mail: sofie.pokorna@vutbr.cz