Planning for Cultural Ecosystem Services

A Study of Socialist and Post-Socialist Zagreb, Croatia

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Thesis submitted to the University of Nottingham
for the degree of Doctor of Philosophy

March 2022

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ACKNOWLEDGEMENTS

Coming from planning in practice, my aim for this journey was to combine urban planning with some new aspects that were only emerging in Croatia. I found that in the cultural ecosystem services concept, whose implementation could be only shyly glimpsed from practice. Now more than four years later, I hope that this study will encourage more applied research of cultural ecosystem services from urban green and blue spaces in Croatian cities.

More than anyone else, my supervisors, Chris Ives and Charles Watkins, deserve my sincerest thanks for this whole journey—for all the encouragement, knowledge, advice and time they provided me with. Special thanks to Valerija Kelemen–Pepeonik who helped me immensely by connecting me with many urban planners in Zagreb and providing me with numerous planning documents and other relevant literature. Thanks also to Ivana Katurić, who introduced me to Valeria and offered helpful suggestions early in the research design.

Special thanks to Issa and Marko, who provided me accommodation, relaxing company, and entertainment while doing fieldwork in Croatia. Thanks for the accommodation and intellectual conversations to Ksenija Bratinčević when I conducted interviews in Zagreb.

Many thanks to Nives Škreblin, Kristina Mudronja, Marina Benazić and Ivica Halapir, who helped me obtain historical data. Thanks also to Gary Priestnall and Suzanne Seymour, who provided insightful and helpful comments and suggestions during my PhD journey. Thanks must also go to Suzana Dobrić and Sara Vulić, who jumped in when I needed help with the interpretation of urban plans, as well as to Betsabe De la Barreda–Bautista and Luka Valožić, who answered my questions regarding GIS. And special thanks to Ivan Bjelajac for help with the lovely schematics of the 5P framework.

I am grateful to AHRC Midlands3Cities for funding and the School of Geography, UoN, for facilitating my PhD journey. Also thanks to my PhD peers Jahzeel, Phil, Olumese, Emma, Henry, Pooja, Hazel, Vanessa, Yuzhi, Ahmad, Basiru and Sile who made the journey easier, eventful and entertaining.

Finally, my special thanks go to my family—my partner Ivan, brother Kristian and parents Vlado and Jadranka, who coped with me writing the thesis for whole days and unconditionally supported and encouraged me and rejoiced with me in my accomplishments.

ABSTRACT

Ever since the early 2000s, there has been considerable research on the contribution of cultural ecosystem services (CES) to human wellbeing. However, their application in planning has lagged because they differ profoundly from other kinds of ecosystem services. Moreover, most studies on practical aspects of CES have been carried out in high-income countries. In contrast, socialist and post-socialist perspectives have rarely been addressed despite studies indicating that socialist regimes used to provide abundant urban green and blue spaces (UGBS), which are considered the main providers of CES in urban areas.

This thesis addressed this gap by exploring how urban planning in Zagreb, Croatia, incorporated, enabled and responded to CES across different socio-political and ideological periods, i.e. socialist (1945–1991) and post-socialist (after 1991) regimes. The study involved the collection and analysis of spatial data (historical aerial images), planning documents (historical urban plans), and interviews with 88 participants (park users, gardeners, urban planners, academics, and local activists). To facilitate analysis, a new framework for researching planning considerations of CES was devised, named the "hatch and grow" strategy. Four case study units were selected based on the time of construction and the presence of specific types of UGBS: (1) the Lower Town, (2) Trnsko and Siget neighbourhoods, (3) Savica Neighbourhood, and (4) Jarun and Vrbani neighbourhoods.

The spatial analysis of aerial images and urban plans of Zagreb confirmed the hypothesis that the provision of UGBS peaked in the socialist period and virtually died out in the post-socialist period. Subsequent content analyses of urban plans and interview transcripts confirmed the more beneficial role of the utilitarian socialist approach to urban nature for human–nature interactions compared to the capital-oriented post-socialist urban planning. While interviewed park users indicated a number of CES generated in socialist parks, gardeners suggested that the provided opportunities were not as diverse to satisfy all residents who thus created wild collective gardens to elicit different sets of CES.

The proposed framework for researching planning consideration of CES helped explain links between UGBS, users and CES from a historical perspective. This research demonstrated the complex yet profound legacy of historical socio-political context on contemporary urban CES, and the important implications this has for planning for urban CES.

Word count: 94,592

MEMORANDUM ON THE PAPERS

The thesis includes papers that have been published by, are being considered for, or have been prepared for publication in scientific journals. The table on the next page outlines the current status and position of each paper in the thesis. In the case of published papers, the author's accepted manuscript was included in the thesis. There may be minor discrepancies between the author's accepted manuscripts and the published versions resulting from the copy-editing process. In order to avoid duplicating references, the unified list of references from all the papers and non-paper sections is provided at the rear of the thesis.

As demonstrated by the role of the lead author on all papers, I made prevalent contributions to each paper. This included conceptualisation, selection of methods, collection, editing and processing of data, conducting analyses, writing and editing text, and creating and editing graphical and tabular elements. Published papers I and II were referenced in other papers as 'Tandarić et al. (2019)' and 'Tandarić et al. (2020)', respectively.

The current status of each paper:

Paper № in the thesis	Title	Authors	Status	Journal (year of acceptance) or target journal	Page № in the thesis	Chapter №
I	Urban planning in socialist Croatia	N. Tandarić, C. Watkins, C. D. Ives	published	*Croatian Geographical Bulletin* (2019)	14–52	1
II	Can we plan for urban cultural ecosystem services?	N. Tandarić, C. D. Ives, C. Watkins	published	*Journal of Urban Ecology* (2020)	66–102	2
III	Greening cities since 1945: An analysis of the quantitative provision of urban green and blue spaces in socialist and post-socialist Zagreb, Croatia	N. Tandarić, C. D. Ives, C. Watkins, L. Valožić	submitted	*Urban Ecosystems*	123–152	3
IV	Collective urban gardens in socialist and post-socialist Zagreb (c. 1950-2021)	N. Tandarić, C. Watkins, C. D. Ives	in preparation	*Landscapes*	154–176	4
V	The generation of cultural ecosystem services in socialist and post-socialist urban green and blue spaces in Zagreb, Croatia	N. Tandarić, C. Watkins, C. D. Ives	in preparation	*People and Nature*	178–213	5
VI	"In the garden, I make up for what I can't in the park": Reconnecting retired adults with nature through cultural ecosystem services from urban gardens	N. Tandarić, C. D. Ives, C. Watkins	submitted	*Urban Forestry and Urban Greening*	215–246	6
VII	From city in the park to "greenery in plant pots": Planning opportunities for cultural ecosystem benefits in socialist and post-socialist Zagreb	N. Tandarić, C. D. Ives, C. Watkins	under review	*Land Use Policy*	248–275	7

ABBREVIATION LEGEND

AGUP	Administration for the General Urban Plan
CEB	cultural ecosystem benefit(s)
CES	cultural ecosystem service(s)
CIAM	Congrés internationale de l'architecture modern (International Congresses of Modern Architecture)
CICES	Common International Classification of Ecosystem Services
DDP	detailed development plan
DUP	detailed urban plan
ES	ecosystem service(s)
GUP	general urban plan
IUP	implementation urban plan
MEA	Millennium Ecosystem Assessment
NCP	Nature's Contributions to People
OAL	organisation of associated labour
PPGIS	public participation geographic information system
RO	research objective
SPU	service providing unit
SRC	sports and recreation complex
UBS	urban blue space(s)
UDP	urban development plan
UGBS	urban green and blue space(s)
UGS	urban green space(s)
UPIC	Urban Planning Institute of Croatia
WoS	Web of Science

1. Introduction and background

> *"If we concentrate our attention solely upon the city, seeing in it the ultimate symbol of 'man's' conquest of 'nature', we miss the extent to which the city's inhabitants continue to rely as much on the nonhuman world as they do on each other."*
>
> **William Cronon** (1991, p. 18),
> environmental historian

Rapid industrialisation and urbanisation in the 19th century instigated demands to improve living and health conditions in many cities (Haase et al., 2018). City authorities and urban planners introduced public parks for recreation and environmental benefits (e.g. Hyde Park in London, Prater Park in Vienna, Central Park in New York) as well as allotment gardens that ensured food for urban workers' households (Bell, 2016). Interest in the benefits of nature in parks and gardens grew and was translated into concepts such as *Garden City* (Howard, 1898), *City Beautiful* (Vicuña & Galland, 2018) and *Radiant City* (Le Corbusier, 1933). Along with the strengthening of the environmental movement, these concepts encouraged the provision of public parks in the 20th century.

The attempts to systematise and classify nature's contributions to human society and individuals after the mid-20th century culminated in their conceptualisation as *ecosystem services* (Daily, 1997b; Ehrlich & Mooney, 1983). When the United Nations began a global assessment of the human impact on the environment in 2001, it employed the ecosystem services concept popularising it in research and practice domains. The Millennium Ecosystem Assessment (MEA) classified ecosystem services into four categories: provisioning, regulating, cultural, and supporting (MEA, 2003). Provisioning services are

products obtained from ecosystems such as food, water, fibre, etc. Regulating services include ecosystem processes that benefit human survival (e.g. climate regulation, water purification, pollination). Cultural services correspond to the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences. Finally, supporting services are ecosystem processes necessary for producing all other ecosystem services (e.g. soil formation, nutrient cycling, primary production) (MEA, 2003).

While nature in public parks provides or indeed contributes to the provision of at least some ecosystem services from each category, it is predominantly cultural ecosystem services (CES) that attract people to parks (Taylor et al., 2020). The links between CES and urban nature have become the dominant paradigm in CES research (Dickinson & Hobbs, 2017; Mexia et al., 2018). Yet, researchers have recorded the increasing trend of diminishing contact with nature and alienation from nature over the late 20th century because of the urban way of life and decline in opportunities for direct experience of nature in cities (Soga & Gaston, 2016). The adverse effects have been linked to child development (Louv, 2008), human health, especially mental health (McEwan et al., 2020), and reduced emotional affinity and values for nature and willingness to protect it (Pyle, 1993; Soga & Gaston, 2016).

The research community increasingly calls for humanity to reconnect with nature (Ives, Giusti, et al., 2017; Ives et al., 2018; Lin et al., 2014) supported by the increased provision of urban nature sites (Lin et al., 2014; Soga et al., 2015). Direct contact with the natural environment is vital in forging an emotional connection with nature (Pyle, 1993). Such calls have encouraged researchers to understand better how nature contributes to human wellbeing, and the CES concept was proposed as a promising tool in this endeavour (Andersson, Tengö, et al., 2015). CES have been recognised as contributions to human wellbeing arising from human–ecosystem relationships (Chan et al., 2011; Fish, Church, & Winter, 2016). However, if the global urban community is to operationalise this knowledge, it has to translate it into practice.

Planning and managing urban nature to stimulate human–nature connection via the provision of CES is still in its early stage of development. The initial conception of socio-cultural benefits from nature presented in MEA (2005) proved difficult to handle due to their intangibility, intertwinement with subjective perceptions and incommensurability (Chan et al., 2011; Fish, Church, & Winter, 2016; La Rosa et al., 2016). Few papers have explored how CES can be incorporated into urban planning (Campbell et al., 2016; La Rosa et al., 2016; Macháč et al., 2020), and more effort is needed to adjust the concept for practical application. If this venture is successful, CES have promising prospects to advance the governance of urban nature, improve its effects on human wellbeing and become a gateway to achieve urban sustainability (Andersson, Tengö, et al., 2015).

While seeking ways to operationalise CES in urban nature governance, we must acknowledge the multitude of socio-political, cultural and economic contexts in which urban nature is provided, used and valued. Review studies have shown that over the last two decades, most articles[1] on urban nature were focused on western cities, with a recent upsurge in Chinese studies (Ying et al., 2021). Similar trends have been observed in research on CES (Kosanic & Petzold, 2020; La Rosa et al., 2016; Milcu et al., 2013). This suggests that knowledge and insights for practice predominantly come from high-income countries with a long free market tradition and slowly-growing populations. In contrast, the urban nature governance in developing, socialist and post-socialist countries might need different insights and approaches.

The literature indicates that European socialist regimes planned and supplied nature in cities abundantly over the 20th century, but there have been significant changes over the last 30 years (Badiu et al., 2019; Haase et al., 2018; Hirt, 2013). By acknowledging the inextricable link between urban nature and

[1] It should be noted that the reviews tend to browse abstract and citation databases such as Scopus and Web of Science for keywords in English language. While many indexed articles may have titles, abstracts and keywords in English, some may not.

CES, the question arises *how did urban planning incorporate, enable and respond to CES in different socio-political and ideological settings?* The research on CES and relational values for nature revealed that the supply of CES is a function of both the availability of urban nature and the personal factors (Fischer & Eastwood, 2016; Raymond, Giusti, et al., 2017). This implies the more potent role of urban nature planning for the CES production—the quantitative supply of natural spaces might need to be accompanied by qualitative interventions in landscape design, appropriate equipment and vegetation, etc. (Cheng et al., 2021b).

Unlike the abundant supply of urban nature, the relationship between urban nature design and CES in the European socialist context has been rarely examined (cf. Kowarik, 2019; Rall et al., 2017). Studies witness the technocratic approach in most socialist regimes where the provision of urban nature area per capita was prioritised over the content and design of those sites (Djokić et al., 2018; Haase et al., 2018). The latter were often generic and unvaried (Gulin Zrnić, 2009; Kristiánová, 2016). Today, those spaces are spread across post-socialist cities alongside the newly developed ones. Confronting the two ideological perspectives—socialist and post-socialist—on urban nature planning might reveal systemic differences in providing opportunities for CES production and provide valuable lessons for the operationalisation of CES in practice.

The research question outlined above will be explored in the case study of Zagreb, Croatia. As the second-largest city in former Yugoslavia, between 1945 and 1991, Zagreb was developed as a representative socialist city (Korov, 2012). After the fall of socialism in 1991, Zagreb became the capital of the neoliberal democratic Republic of Croatia, entering an exhausting social, political and economic transition, which reflected on planning, management and appreciation of urban nature. As the national capital and economic and cultural centre, Zagreb is an excellent arena for exploring urban nature governance and CES provision in different socio-political settings. Yet, it is also a unique case in that it witnessed a hybrid system between western and soviet urbanism. While urban planning in socialist Croatia was based on communist ideologies, Yugoslavia's ‘non-aligned’

position[2] allowed for lively interactions between Croatian planners and western theories and practices, which were then implemented in Yugoslav cities, with Zagreb being a model (Premerl, 1986; Premužić, 1962). In that sense, the case of Zagreb's socialist and post-socialist urban planning may epitomise a link between western and soviet urbanism and contribute to the understanding of post-war division and latter reconciliation of the two planning systems and views on city development and its relation to nature. The study focuses on the period between 1944 and 2020[3].

[2] After the Soviet–Yugoslav split in 1948, the Yugoslav leader Tito initiated the Non-Aligned Movement in 1961 in association with other countries that did not want to align with either of the Western and Soviet blocs. The non-aligned position facilitated political and economic relations with both spheres, including study visits, higher education and trainings.

[3] The boundary years were determined by the methodological issues: the most relevant historical spatial data predate the socialist period by one year, while the field research finished in 2020.

1.1. Brief overview of the spatial development of Zagreb

> *"Throughout this century when Zagreb has been evolving into a big European city, by and large its development has been managed (…) in a way that ensured the conditions for the necessary relationship between traditional urban values and modern urban expansion."*
>
> **Stanko Žuljić** (1999, p. 55),
> geographer and urbanist in Zagreb

For more than 800 years, Zagreb was a regional political and economic centre under various Hungarian and Austrian monarchies. Its original site was on two adjoining small hills, which formed a protection from Ottoman attacks (Fig. 1.1: top left). When those ceased in the late 17th century, streets were developed below the hills mimicking the urban development of Habsburg capital of Vienna. The city began to expand very quickly after the arrival of the railway in the mid-19th century. A new grid of streets was constructed beneath the hills (Fig. 1.1: top right), with a U-shaped chain of parks similar to Vienna's Ringstrasse (Blau & Rupnik, 2007). The chain known as the Green Horseshoe became one of the identity symbols of Zagreb. The rapid growth of Zagreb was not even hindered by the pro-Hungarian city administration (Schuman, 2004).

When the Austro–Hungarian Empire collapsed after the First World War, Zagreb remained a regional centre in the new Kingdom of Yugoslavia ruled by majority Serbs. Subsequently, its influence on state politics was limited despite its economic domination (Blau & Rupnik, 2007). Continued industrialisation increasingly attracted immigrants who would settle on the city's edges, mostly erecting unplanned settlements with no public infrastructure besides streets (Žuljić, 1965). The ineptitude of the city authorities resulted in large areas with substandard living conditions between the railroad on the north and Sava River

on the south (Fig. 1.1: bottom left), which none of the subsequent city administrations have successfully rehabilitated (Bešlić, 2005).

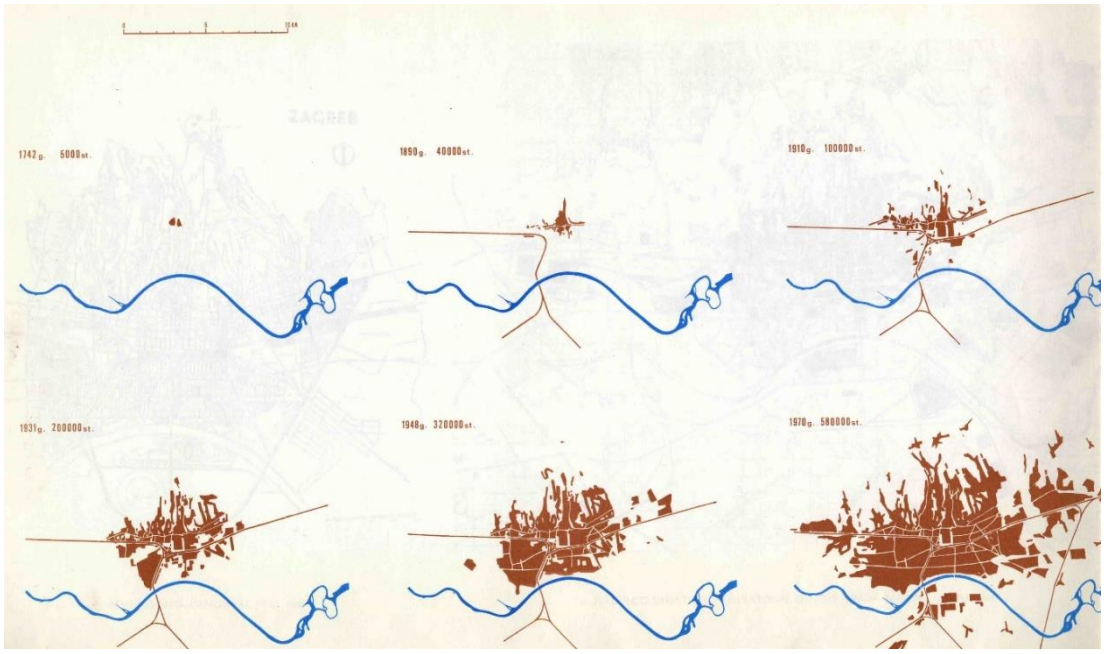

Fig. 1.1. Spatial development of Zagreb between 1742 and 1970. (Years from left to right—top row: 1742, 1890, 1919; bottom row: 1931, 1948, 1970.)

Source: GUP (1971).

A significant change in the direction occurred in the late 1920s when a modernist approach was imported to Zagreb by architects and urban planners schooled across Europe (Premerl, 1986). City planners, who were influenced by the International Congresses of Modern Architecture (Congrés internationale de l'architecture modern; CIAM), announced an international competition for a plan of Zagreb (Kolacio, 1970). The new, modernist plan was supposed to turn the previous trend of city expansion across the east–west axis and lead the expansion towards Sava River, improving the poorest housing (Blau & Rupnik, 2007). But by 1940, when the plan was adopted, the unplanned sections had grown considerably and then the onset of war hindered its implementation (Antolić, 1953). As the capital of a quisling Independent State of Croatia during the Second World War, the Allies bombed Zagreb several times and the defenders dug

bunkers, shelters, and trenches in the parks (Ungar, 1949). After liberation in 1945, the partisans found the city in terrible condition and immediately began its reconstruction (Antolić, 1949).

The post-war socialist government instigated a thorough programme of industrialisation and urbanisation, encouraging farmers to migrate to cities (Glamuzina & Fuerst–Bjeliš, 2015). Zagreb's population more than doubled between 1945 and 1991 (DZS, 2005). The urban planners' resistance towards the socialist realism imposed by the Soviets was exonerated shortly after the Tito–Stalin split in 1948 (Vranić, 2015). The socialist planners were committed to international modernism and the functionalist principles defined by CIAM and Le Corbusier and created functional and autonomous neighbourhoods (Blau & Rupnik, 2007). A new socialist Zagreb developed concentrically towards the south, east and west (Fig. 1.1: bottom right), largely ignoring the extensive areas of informal housing built before the Second World War (Fig. 1.1: bottom in the middle). The expansion slowed down subsided by the 1980s, leading to the consolidation of the city territory, which continued after the collapse of the socialist regime in 1991 (Knežević, 2003).

The 1990s were marked by the ideological, socio-political, and economic transition away from state-led development and a controlled market to free-market development led by private investors. Private land ownership is legally treated as of paramount importance (Simonetti, 2010). The contrasting value systems of the two ideologies have been reflected in planning policy and different stances towards urban nature. During the post-socialist period, they also have resulted in conflicts over public (green) spaces in Croatian cities between users, city authorities, and private investors (e.g. Čuvamo naš park!, 2017; Štulhofer, 1991). This aspect of the transition has been insufficiently addressed in Croatian research, while the change in planning and management of urban nature is practically unstudied.

1.2. Research aims and objectives

> *"We must find a way towards a modern 'natural city' because this is not only one of the most important contemporary questions of our existence but also our direct responsibility towards future generations."*
>
> **Antun Petak** (1976, p. 102),
> sociologist in Zagreb

The study starts from the premise that CES are a helpful conceptualisation of nature's contributions to human wellbeing. Planners have long been aware of the importance of urban nature sites within cities. Recognising the multitude of conceptualisations of intangible ecosystem's contributions to human wellbeing (e.g. Nature's Contributions to People (Díaz et al., 2018)), the CES concept was chosen for this study as it has been developed and refined over the decades, passing through a broad set of theoretical and conceptual considerations, and it already has a firm scientific linkage to urban nature studies (Dickinson & Hobbs, 2017).

This research aims to answer a fundamental research question:

How did urban planning in Zagreb incorporate, enable and respond to CES across differing socio-political and ideological periods?

Answering that question requires understanding the change in planned and implemented provision and spatial distribution of urban nature sites in the studied period, general settings and principles guiding urban planning, and CES-relevant characteristics of urban nature addressed in planning. The following research objectives were developed to direct the process of finding an answer to the research question:

RO1 Develop and test a conceptual approach for exploring how CES are facilitated by urban planning.

RO2 Reconstruct the change in spatial patterns of the planned and actual urban nature sites in reference to urban plans and identify the underlying agencies.

RO3 Identify patterns of and underlying motivations for the use of urban nature sites for CES.

RO4 Determine the extent to which urban planning facilitated the generation of CES and identify the underlying reasons.

RO5 Generate insights for planning for urban CES.

Since planning for urban CES is a relatively new area of research (cf. Cortinovis & Geneletti, 2018; Geneletti et al., 2020; Wilkinson et al., 2013), the first objective involves devising a suitable conceptual approach, which will be developed in Chapter 2 and tested in subsequent empirical chapters, which will also address the remaining research objectives.

1.3. Structure of the thesis

This thesis contains papers that have been published by, are being considered for, or have been prepared for publication. The structure of the thesis integrates publishable/published sections with conventional ones. This chapter—*Introduction and background*—presents the aims and objectives of the research and digs into the urban history and planning background of Zagreb. Sections 1.4 and 1.5 examine the policies, processes and patterns in urban planning in socialist and post-socialist Croatia, which underpinned the provision of urban nature in Zagreb. The second chapter—*Concepts and methodology*—critically reviews the relevant concepts of urban nature and CES, conceptualising the epistemological approach to research of planning for urban CES. Section 2.2 also develops a framework for planning for urban CES, which is suitable for analysing the urban nature planning outcomes regarding the generation of CES (=RO1). The framework informs the methodological approach outlined in the following sections.

Chapters 3 and 4 deal with changes in the spatial distribution of urban nature sites across the socialist and post-socialist periods. Chapter 3 employs historical aerial images and land use plans of Zagreb to determine the change in the spatial distribution of urban nature and outlines the planning, implementation and governance-related patterns and processes that have led to those changes (=RO2). Chapter 4 focuses on origins, evolution and use of a distinct type of urban nature, collective urban gardens, which emerged contrary to urban plans but were indirectly facilitated by the plan implementation (or indeed lack of it).

Chapters 5 and 6 examine the change in perception, appreciation and use of urban nature from a cultural ecosystem services perspective using interviews with relevant stakeholders (=RO3). Chapter 5 elucidates how urban CES are generated, perceived and appreciated in various forms of urban nature other than collective urban gardens. Chapter 6 explores how older adults interact with different types of collective urban gardens to generate CES and how different

management regimes can influence the provision of CES in those. The interview data are processed through the framework outlined in section 2.2 to test it and obtain insights into how the CES generation process interacts with various aspects of urban nature planning.

Chapter 7 examines how processes of planning urban nature have changed over time and how these have influenced the emergence of cultural ecosystem services (=RO4). It uses the conceptual approach to planning for urban CES (section 2.2) to examine socialist and post-socialist urban plans of Zagreb, testimonies of planning stakeholders, and relevant professional literature to uncover how the two ideologies have influenced the provision of opportunities for the CES generation. The thesis finishes with Chapter 8, which synthesises the findings from the empirical chapters and discusses the emerging topics, deliberates about implications and insights for urban planning practice (=RO5), and outlines further research directions. A unified list of bibliography follows the discussion chapter.

1.4. Urban planning in socialist Croatia

"(…) the period after the Second World War when modernist principles were gaining full momentum: it was a phase of intensive urbanisation of the whole country marked by urbanist and architectural creations founded in ideological premises of CIAM and commitment to international style, when entire neighbourhoods, industrial, hospital and recreational complexes, roads and traffic systems are built. In other words, when the then creative elite, with their wide range of expression possibilities, was called to action. The garden art got its big chances as well, primarily in the creation of new public spaces, but also in reconstructions of neglected or destroyed parks and historical gardens."

Snješka Knežević (1992),
urbanism historian in Zagreb

This section is written as a review paper published in *Croatian Geographic Bulletin* in 2019 as a bilingual review article. Hence the figures in the paper are also bilingual—containing inscriptions in both English and Croatian.

The paper reviews the urban planning legislation and practice in Croatia during the socialist period (1945–1991). The look at the planning on the national level provides the much-needed context in which planning of urban nature in socialist Zagreb was conducted. The paper examines the legislation that regulated urban planning in different decades, the political and institutional responsibility for planning affairs at national and local levels, composition and disciplinarity of planning teams, public participation in planning, plan execution and environmental concerns addressed by planning. In addition, the relationship between urban and societal planning inherent to socialist regimes was considered. Given Zagreb's rapid expansion in the socialist period, the city's planning office and teams were often agents of changes in the planning sector and influential stakeholders in creating national policies.

PAPER I

Urban planning in socialist Croatia

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Status of the paper: **published**

Reference:

Tandarić, N., Watkins, C., & Ives, C. D. (2019). Urban planning in socialist Croatia. *Hrvatski Geografski Glasnik*, *81*(2), 5–41. https://doi.org/10.21861/HGG.2019.81.02.01

Abstract

For almost half of a century, urban planning in Croatia took place under the socialist regime. During that time, it mostly played a role in addressing the pressing space-related issues of the development of socialist society, and in facilitating economic growth. In this paper, we examine urban planning in Croatia between 1944 and 1991 from eight aspects: the general roles of planning; legislation; relationship to societal planning; political-institutional responsibility; urban planners and policy; plan execution; public participation; and environmental concerns. We analysed archival data and literature on urban, spatial and societal planning legislation and practices in the Socialist Republic of Croatia, including the planning journals *Arhitektura* and *Čovjek i prostor*, and planning legislation from the socialist period. We outlined the five evolutionary phases over which urban planning experienced decentralisation from the federal to the communal level, advancements in public participation, and the involvement of environmental considerations in the decision-making process. We also studied the evolution of planning tools, which originated in the socialist period but remain in use today.

Keywords: Croatia, general urban plans, planning legislation, socialist regime, urban planning

Introduction

Urban planning is one of the oldest and most omnipresent civilizational practices. It began with the first towns, but it only developed into a profession in the 19th century—as a reaction to chaotic conditions in industrial cities (Hirt, 2005). It usually developed locally, underpinning development of industrial or military cities, and only in the 20th century did it become regulated by national legislation. Notwithstanding its initial locally and (later, in the 20th century) nationally regulated development, urban planning was often influenced by the practices and doctrines of influential planners, who pushed its progress forward in a particular region[4]. The process of development and maturation of urban planning in Croatia followed the same pattern. However, for almost half of the 20th century, planning developed under different social, ideological, political and economic conditions after Croatia, then part of the second iteration of Yugoslavia, adopted socialism. Knowing the history of urban planning could reveal why cities are designed the way they are, how urban planning influenced their development, and how that legacy is reflected in their spatial structure and organisation today. Throughout the 20th and 21st centuries, historical studies of national urban planning systems have been written for many countries (e.g. Corkindale, 1997; Reiss, 2017; Schaffer, 1988; Wagenaar, 2011). In Croatia, a few studies have covered or significantly touched upon urban planning of particular cities in certain periods (e.g. Arbutina, 2007; Došen, 2012; Slukan Altić, 2012). To date, a comprehensive summary and synthesis of urban planning in Croatia has not been conducted.

This paper aims to stimulate the study of the history of urban planning in Croatia. It provides a systematic overview of the urban planning system in the Socialist Republic of Croatia (SR Croatia) between 1944 and 1991. The overview is based on a critical analysis of archival data and literature regarding urban, spatial, and societal planning legislation and practices in SR Croatia, supported

[4] E.g. German planner Josef Stübben and Austrian urbanist Camillo Sitte, who influenced urban planning in Europe in the late 19th and early 20th centuries.

by general historical information. The archival data analysis entailed reviewing the planning journals *Arhitektura* (1947–1991) and *Čovjek i prostor* (1954–1991), as well as urban, spatial, and societal planning legislation from the socialist period.

The period can be divided into five phases (Table 1.1). Within these phases, we considered the general role of planning, urban planning legislation, relationship to societal planning, political-institutional responsibility for urban planning, urban planners and policy, plan execution, public participation in urban planning, and environmental concerns. From the very beginning of the socialist period, urban planning played a *role* in most important contemporary undertakings, which will be analysed through each evolutionary phase. Urban planning *legislation* was a critical factor in determining these five phases as it had a profound impact on planning practices in the considered period. In *relationship to societal planning*, we analysed how urban planning fit into the overall socialist planning system and to what measure it retained independence from economic planning. Societal planning (*društveno planiranje* in Croatian) was one of the fundamental features of Yugoslav socialism. In contrast to social planning, which is usually considered to be directing the social development of a community (Piha, 1973) and programming for selected social goals (Dyckman, 1966; Peattie, 1981), societal planning in Yugoslavia was concerned with directing economic development (Piha, 1973). The distinction is much more pronounced than the linguistic difference suggests and for the sake of distinguishing this important difference, we use the term "societal planning" over "social planning" throughout the paper.

Furthermore, we analysed *political-institutional responsibility* for urban planning, which means the basic level at which planning is conducted as well as the institutions at different levels that were responsible for the facilitation of planning. In *urban planners and policy*, we investigated how urban planners and professional planning organisations affected planning policy on the level of the republic and, where relevant, the local level. We also examined *plan execution* as legislation tended to prescribe the planning process but not the implementation

Table 1.1. Overview of the five evolutionary phases of the socialist urban planning system in Croatia

Period	1944–1949	1949–1961	1961–1973	1973–1980	1980–1991
Dominant historical process	Post-war reconstruction	Installation of self-management and communal systems	Economic reform	Introduction of confederalism	The beginning of the regime's demise and political and economic transition
The general role of planning	Professional assistance in reconstruction	Supporting economic growth and satisfying housing needs	Supporting economic growth and facilitating the spatial expansion of cities	Supporting long-term socio-economic development	Facilitating urban development through renewal and investments
Political-institutional responsibility	Federal/republic	Republic/communal	Communal	Communal/republic	Communal/republic
Legislation	None	*Basic Regulation on General Urban Plan* (1949)	*Urban and Regional Spatial Planning Act* (1961)	*Physical Planning and Construction Land Use Act* (1973)	*Physical Planning and Spatial Organisation Act* (1980)
Relation to societal planning	No explicit societal planning to date	Urban planning subordinated to societal planning in theory	Urban planning is part of societal planning	Urban planning is part of societal planning	Urban planning is part of societal planning

Urban planners and policy	Planners (predominantly architects) direct reconstruction plans and projects	Planners (predominantly architects) initiate the implementation of regional planning	Planning organisations become multidisciplinary	Consolidation of multidisciplinarity and consultant services	Planners reassess earlier ambitious plans and turn to rationalisation
Plan execution	Via labour actions and private capital	Tolerated informal construction hinders plan execution	Tolerated informal construction hinders plan execution	Tolerated informal construction hinders plan execution	Investors' interests often given advantage over plans
Public participation	None	Public display of GUPs introduced	Compulsory public display of plan proposals; groups' remarks valued over individuals' remarks	Compulsory public display of plan proposals; strengthened the role of local communities	Compulsory public display of plan proposals; strengthened the role of local communities
Environmental concerns	No explicit considerations	No explicit considerations in legislation	Vaguely addressed in legislation; left to planners for consideration	Extensive considerations in legislation; questionable implementation	Extensive considerations in legislation implementation

nor financing of planned interventions. Since *public participation* began to be practised in western planning systems in the second half of the 20th century, we examined the extent to which that also happened in the Yugoslav system. Finally, we reviewed the *environmental concerns* considered in planning legislation, urban plans, and their implementation.

Legacy of urban planning from pre-socialist period

Early traces of urban planning in Croatian territory date back to Roman coastal settlements (Vresk, 1990). Early town regulations of Dubrovnik from 1272 have also survived, but these are the exception (Salaj, 1988). Ottoman expansion between the 16th and 18th centuries introduced defensive town planning and several fortified cities with regular plans were built, e.g. Karlovac, Bjelovar, Koprivnica (Krajnik, 2015; Slukan Altić, 2006).

Formal planning began in the 19th century. The introduction of railways to central Croatia and the Croatian Littoral boosted industrialisation, which in turn caused rapid urban growth. Consequently, regulation plans were introduced as a new planning tool (Blau & Rupnik, 2007). For the first time, these plans considered the whole area of a city and planned locations for expansion and the layout of infrastructural systems such as the water supply, sewage, and gas. Regular networks of blocks and streets were introduced along with the German practice of functional zoning of city areas for residential, industrial, commercial, and other purposes (Blau & Rupnik, 2007). In general, Croatian urban planning of the 19th century was strongly influenced by theories from the prominent Central European planning schools, with planners schooled in cities of Austria–Hungary and Germany (Slukan Altić, 2012).

The post-First-World-War period saw continued urban growth and technological progress in transport systems which enabled stronger functional connections between cities and their regions. This presented new challenges for urban planning (Marinović–Uzelac, 2001). Furthermore, the legal unification between the more-developed northern and less-developed southern parts of

Croatia, which reflected the situation throughout the whole of the Kingdom of Yugoslavia, demanded different approaches in planning both cities and regions. Urban planning eventually became regulated at the state level under the 1931 Building Act, which was formulated under the influence of Western concepts (Dabović et al., 2017). The act was considered progressive and influenced later socialist planning legislation (Marinović–Uzelac, 2001). Croatian architects and urban planners were linked with broader European ideas (Franković, 1985) and gained authority and influence (Nedović–Budić & Cavrić, 2006). Based on the new act, the first international call for development of a new regulatory plan for Zagreb was carried out. The new plan represented an exemplary modernist urban plan based on functionalist concepts (Franković, 1985; Knežević, 2007). The Second World War caused enormous damage to many cities, some being largely destroyed (Zadar, Slavonski Brod), and disrupted planning activities.

Early socialist urban planning (1944–1949)

The Second World War left the territory of Croatia devastated, and in urgent need of physical and economic restoration (Glamuzina & Fuerst–Bjeliš, 2015; Grbić, 1975). The communist party outlined three pressing objectives: post-war reconstruction; industrialisation; and electrification. Following the Soviet model, these were transformed into the first five-year plan in 1946 (1947–1952), aiming to induce economic growth and create income for the state budget in order to finance further projects. The lack of capital for financing large projects was compensated with voluntary work, mainly through "Labour Actions", and mandatory contributions for industrialisation by farmers—the predominant social group (Glamuzina & Fuerst–Bjeliš, 2015). While the primary focus of the socialist government was economic development, urban planners were given an important role in directing the reconstruction and planning of cities to support economic development. At that point, only around one-fifth of Yugoslavians lived in cities, but that share started rising rapidly along with industrialisation (Žuljić, 1975).

Legislation

During its first five years, the socialist regime drew heavily on inherited planning legislation. The inter-war act was considered a good guide with established planning rules regulations, which could be implemented to avoid uncontrolled building development (Premerl, 1986). However, the existing legislation could not ensure strict implementation of urban planning principles because of the fast pace of reconstruction and development. On the other hand, there were very few trained planners and little time available for drafting new comprehensive urban plans (Piha, 1973) and even those that had been drafted were seen by some to hinder construction (Premužić, 1962).

Although there was no new planning legislation, two other laws had a profound impact on planning in that period. Already in 1945, the federal government adopted an act that converted all state property into people's property (ZZNDNU, 1945). In cities, these were mainly public and administrative spaces which became subject to public redevelopment projects such as the reconstruction of parks, squares, children playgrounds, and thoroughfares. Another was the Expropriation Act (OZE, 1947), which allowed the expropriation of private property in the "people's interest", especially for the construction of factories, residential buildings, playgrounds, and other social objects.

Relation to societal planning

While not yet named as such, or by any other name, in this period societal planning was introduced indirectly through regional policy, oriented toward equalising the economic disparity among republics (Burton et al., 1966). Urban planners at the time were not directly engaged with societal planning, despite being occupied with defining the spatial structure and functions of cities to facilitate economic development.

Political-institutional responsibility

In the immediate post-war period, Yugoslavia followed the Soviet pattern: planning was organised as a republic's responsibility although the decisions were made and delegated by the federal government (Burton et al., 1966). The Department for Urban Planning was established in the Croatian Ministry of Construction in 1945, and this was followed by the founding of the Urban Planning Institute of Croatia (UPIC) in 1947, with branches in Zagreb, Split, and Rijeka (Bojić, 2018; Premužić, 1962; Vresk, 1990). The main task of urban planning institutes was to provide regulation plans and baseline studies for reconstruction. When that was not possible, they attempted to at least develop regulation sketches that took existing needs into account (Premužić, 1949). In the first few years, the UPIC created regulation planning documents for more than forty Croatian cities and towns (Salaj, 1988).

The working conditions in the UPIC were poor. The Institute employed fourteen people out of which seven were expert architects who had to cover the needs of all Croatian cities and towns (Premužić, 1962). The only possible mode of working in such settings was a "walk-in" approach where planners received investors with project plans and made planning permission decisions. Furthermore, for most tasks, there were no required and validated data (Petrović, 1954; Premužić, 1962). In 1948, research became one of UPIC's main responsibilities, with the aims of advancing urbanism in Croatia, creating urban planning policies, and training new generations of urban planners (Premužić, 1962).

Urban planners and policy

It was mainly planners from the pre-war period who led the post-war revival of urban planning in Yugoslavia. Despite the dominant socialist ideology, Croatian planners and architects remained committed to international modernism rather than socialist realism, which had taken over throughout Central and Eastern Europe (Blau & Rupnik, 2007). One of the re-initialising

events was the urban planning seminar held in Šibenik in 1944, where planners and other interested parties discussed the renovation of cities, towns, and villages and defined certain guidelines (Kranjčević, 2009). The Architecture Department of the Technical Faculty of Zagreb played an important role in the development of urban and spatial planning training professionals in urban planning and post-war renewal (Vresk, 1990).

Public participation and plan execution

Public participation in planning in this period was practically non-existent. Decisions were made mostly at the federal level and executed at the republic level. Due to the lack of funds from the federal budget, the government had to rely on other approaches for renovation and construction. The first such approach was to mobilise a labour force for the execution of plans and projects (Fig. 1.2). Unemployed youth and adults undertook work that did not require vocational skills (Glamuzina & Fuerst–Bjeliš, 2015) and in this way restoration progressed faster and the economy began to revive[5].

Another approach was using private investor's capital. However, under the conditions in a young Yugoslavia, investors only had enough funds for the construction of buildings while the construction of infrastructure (roads, water supply, sewage, etc.) and exterior, which were part of original projects, were often postponed for the foreseeable future (Maretić, 1959). The urgent need for housing in cities was frequently in conflict with urban planning principles. In many cases, investors would propose temporary buildings, for which they could obtain building permits, but then they would, in fact, build permanent buildings. Such cases deceived the urban planning institutes and authorities that approved

[5] The establishment of labour actions did not have the sole goal of securing a cost-free labour force, it also had other functions among which two can be stressed: the creation of a sense of belonging to a cohesive multinational Yugoslav community and collaboration among youth from all around Yugoslavia which forged a sense of brotherhood and unity through shared experience (Baković, 2015).

co-financing and meant that public funds were used to construct buildings in poor locations which hindered later urban development (Premužić, 1962).

Fig. 1.2. Volunteer workers dancing during a break of a labour action for construction of new housing in Zagreb around 1950.

Source: unknown author, private collection by Milan Vasić "Proletarian Brigades Street from No. 228 to 236 built by voluntary works in 1950/1951".

Environmental concerns

In this early period, environmental concerns were not regulated nor explicitly considered. However, according to Ungar (1949), the 'war wounds' in public spaces created by the destruction of buildings and digging up bunkers, shelters, and trenches were remediated and often transformed into green spaces. Moreover, post-war reconstruction created new urban green spaces within the

development areas in rapidly growing towns. However, the design and layout of these areas was often neglected as greenery around buildings were considered a luxury that was usually postponed for more prosperous times (Premužić, 1962).

The period of early planning legislation (1949–1961)

The split between Tito and Stalin in 1948 radically changed the overall socialist policy in Yugoslavia, opening the way to what came to be known as Yugoslav socialism. In contrast to the centralised Soviet model, the Communist Party introduced the workers' self-management system from 1950 to 1952 as the first step towards decentralisation in all forms of governance and planning, especially economic planning (Grbić, 1975). Decentralisation was further strengthened by the introduction of the communal system in 1955. Via this reform, all wards, which were merely territorial units with negligible authorities, were transformed into communes. According to the Marxist vision of the 1871 Paris Commune (Marx et al., 2008), socialist communes were organised as complex political and socio-economic sub-regional communities with self-managing authorities and their own budgets (J. C. Fisher, 1965). The new system facilitated one of the most rapid rates of economic growth in the world in the 1950s (Horvat, 1966). The growth was concentrated mainly in urban areas and there was a huge influx of people from rural areas who often settled on the margins of cities (Magdalenić, 1971). The rapid urban growth, reflected by housing needs and industrial zones, necessitated great efforts in urban planning (Piha, 1973).

Legislation

The Basic Regulation on General Urban Plan (OUGUP, 1949) adopted in 1949 established the role of urban planning in the socio-economic system of Yugoslavia. Urban planning objectives had to support socio-economic development plans (Nedović–Budić & Cavrić, 2006), which indicated that the early socialist regime saw urban planning as an extension of economic planning.

However, despite being based on Soviet political ideology, the Regulation was drafted following extensive consideration of western planning legislation, particularly German, French, English, Swedish, Dutch, and American. As a consequence, the Regulation combined Western planning principles with the socialist modernist approach resulting in planning the extensive construction of affordable residential buildings in cities (Nedović–Budić & Cavrić, 2006).

The 1949 Regulation introduced a general urban plan (GUP) or masterplan—the new urban planning instrument that would remain present in all future socialist and post-socialist legislation. Predating decentralisation reform, the act defined that city administrations were responsible for drafting and adopting urban plans, following approval from the Ministry of Communal Affairs. The systemic reforms of the 1950s relegated urban planning to lower levels. In practice that meant that republics took on the responsibility of issuing urban planning legislation and cities/communes drafted and adopted plans. As of the 1950s, each Yugoslav republic had its own legislative framework for planning (Simmie, 1989). Problems with the 1949 Regulation included the lack of prescribed physical planning, such as land use plans and zoning (Marinović–Uzelac, 1989), and the scarcity of trained planners capable of producing high-quality plans (Premužić, 1962). Furthermore, a GUP was not able to regulate general construction, rather only capital objects and facilities (Piha, 1973).

Another law that had a profound impact on urban planning was the 1958 Nationalisation of Construction Land Act (ZNNZGZ, 1958), according to which all developed and undeveloped land in cities and towns was nationalised and transformed into people's property (Anonymous, 1980). The aim was to facilitate societal and economic planning at the local level. However, the act created additional problems as buildings and other objects on nationalised land were not nationalised and communes were supposed to purchase these buildings if they sought to redevelop the land. This was a very significant obstacle for many towns (Simmie, 1989).

Relation to societal planning

Societal planning was formally introduced to Yugoslavia alongside the self-management system. It was founded on the presumption that planning is an economic and democratic right and obligation of the working class. Therefore political, social and economic governance should devolve to the level of local communities and enterprises (Dabović et al., 2017). While enterprises had to draft self-management plans, communes and republics planned their general socio-economic development through societal plans. In this new setting, urban planning was considered subordinate to societal planning and technically had the role of providing the physical spatial basis for socio-economic development at the local level (Dabović et al., 2017). Correspondingly, GUPs were now considered subordinate to societal plans and had to comply with them (Piha, 1973).

Political-institutional responsibility

Following the adoption of the new legislation, the new Administration for the General Urban Plan (AGUP) was founded within the Ministry of Communal Affairs in 1949, and the UPIC became subordinated to it (Premužić, 1962). The AGUP aimed to harmonise the planning process by establishing a system of collaboration between different levels of urban planning governance—from communes to UPIC. In practice, however, many communes supported the professionally questionable proposals of influential investors, not realising the long-term damage they could do to their cities or towns (Premužić, 1962).

Along with the systemic reform, the UPIC fell under the Governmental Secretariat for People's Economic Affairs' jurisdiction in 1953 (Premužić, 1962), only to be transformed in 1954 into an independent, self-managed institution operating outside of the administrative hierarchy. Moreover, its regional branches in Zagreb, Split and Rijeka all became responsible for their own financing and were contracted by communes and districts requiring professional assistance (Bojić, 2018). In a way, therefore, urban planning partly became a market-based activity.

The UPIC actively participated in planning tasks and solving urban planning problems across Croatia and Yugoslavia. It conducted urban planning studies and methodological research, drafted planning legislation, and contributed to the organisation of official urban planning (Premužić, 1962). In the 1950s, urban planning bureaus were founded in all republic capitals and many larger cities, and they drafted urban plans for their communes (Piha, 1973).

Urban planners and policy

Urban planning was still dominated by architects and plans often resembled architectural projects rather than comprehensive planning documents. However, professionals from other disciplines started being involved in planning at planning bureaus (Piha, 1973). The second half of the 1950s was characterised by the opening of Yugoslavia to the world (Premerl, 1986), which was reinforced by the establishment of the Non-Alignment Movement, which Yugoslavia helped found. A number of urban planners were trained abroad, in England, the Netherlands, Italy, the USA, Sweden, and Germany, continuing the tradition started in the pre-war period. Moreover, they often made professional visits to different European countries bringing new perspectives to domestic practice (Premužić, 1962).

The establishment of the Ordinary Conference of Yugoslav Urban Planners in 1952 had a substantial impact on the development of the profession. At the third conference in Ohrid, SR Macedonia in 1954, a delegation of urban planners met federal Vice-President Edvard Kardelj and proposed new legal arrangements for urban planning (Petrović, 1954). There were four main points: (1) urban planning should become a mandatory component of societal planning; (2) urban plans should arrange settlements and regions, thereby guiding economic growth; (3) urban plans should be developed for periods of several decades; (4) a comprehensive urban planning service should be established with urban planning councils at both republic and communal levels. The proposal was

accepted and implemented over several years and the Urban Planning Committee was established within republic governments in 1955 (Bukvić, 2012).

Point 2 of the proposal indicated urban planners' interest in regional spatial planning. At the sixth conference in 1957, Croatian urban planners argued that the absence of a comprehensive physical planning system resulted in 'irrational' land use, functional spatial imbalances, missed economic opportunities, and a general decrease in quality of life (Bojić, 2018; Nedović–Budić & Cavrić, 2006). Consequently, the governmental Committee for Regional Planning was founded in 1960 and a year later the drafting of regional spatial plans became an official task of urban planning institutes (Premužić, 1962).

Plan execution

The implementation tools for GUP were prospective and current plans (Piha, 1973). After 1955, communes were responsible for the preparation and execution of both spatial and societal plans, although it soon became obvious that many communes, especially smaller ones, were not up to the task (Burton et al., 1966). Moreover, decentralisation also brought lessened central control over planning and building standards. For instance, the official stance regarding the construction of workers' settlements was in favour of implementing the highest standards which involved functional neighbourhoods consisting of multi-flat buildings surrounded with green spaces (instead of individual houses), central supply centres, and restaurants (Premužić, 1962). But the demand for housing caused by the influx of people, combined with the lack of funds, meant standards were often relaxed (Maretić, 1959). Such informal settlements would be provided with public infrastructure in the same fashion as planned projects (Poropat et al., 2006). Moreover, both government inspectors and local authorities often turned a blind eye to this sort of unplanned development. Rogić (2006) speculates that the regime needed to be seen to be caring for all social groups, especially the edge groups. So as a reward for political support, the regime provided these groups higher living standards via guaranteed work and informal possibilities for access

to housing. But this toleration of informal construction in the 1950s enabled its proliferation in subsequent decades (e.g. Katurić, 2016).

Public participation

The 1949 Regulation did not oblige the plan-makers to engage the public although plans had to be on public display for one month. The latter transfer of planning responsibilities to the commune gave urban planners an opportunity to engage more with local authorities (Bojić, 2018). This did not mean wider engagement with the local public; indeed the local authorities were keener to receive the opinions of developers (Piha, 1973).

Environmental concerns

The new legislation did not mention environmental concerns, although some incentives towards environment protection and provision of urban nature came from the UPIC which employed planners trained in Western Europe[6]. For instance, in 1949, the UPIC developed an urban plan for Zagreb (Fig. 1.3) that proposed new development on the extensive matrix of high-quality public green spaces (Antolić, 1949). The proposal was rejected, *inter alia*, as being too expensive to develop and maintain due to extensive greenspace (M., 1954).

[6] It is noteworthy that between 1954 and 1958 the UPIC was led by Branko Petrović who had studied the legacy of the Garden City Movement in Sweden and England (Bojić, 2018).

Fig. 1.3. The development plan of the new City Centre of Zagreb, part of the unadopted Regulation Plan of Zagreb of 1949.

Source: Antolić (1949)

The period of the first republic urban planning legislation (1961–1973)

Federal planning legislation from 1949 could not keep up with systemic changes introduced in the 1950s nor with rapid construction fostered by industrialisation and urbanisation. However, the new law that passed in 1961 was immediately challenged by the constitutional changes of 1963, which strengthened the self-management and communal systems and made steps towards making local communities, the lowest level administrative units, into self-managing organisations with specific responsibilities and authorities (Constitution, 1963). The late 1960s and early 1970s were characterised with slowing economic growth and Yugoslavia's first political and economic adversities. Construction still thrived, but the economic situation threatened the

completion of projects (Padgett, 1973). At the same time, urban settlements continued growing and, by 1971, two-fifths of Yugoslavians lived in cities (Žuljić, 1975). Nevertheless, urban plans had been adopted only for certain large cities by the mid-1960s (Rendulić, 1966).

Legislation

The first post-war act on spatial planning was passed on 31 May 1961 (ZURPP, 1961). The act differentiated between urban and regional spatial plans, where the role of the urban plan was to direct the spatial development of a settlement and the regional plan directed the spatial development and organisation of regions. As a long-term document (≥ 20 years) the urban plan[7] defined the land use, construction, reconstruction and sanitation conditions and it elaborated proposed solutions in economic and technical terms. The urban plan was conceived as a process starting with the urban plan programme that prescribed the guidelines for spatial development of a settlement and defined the objectives of the plan (Fig. 1.4). Following the programme, the GUP—the basic form of which having been adopted from the previous regulation—was then drafted serving as the legal planning document at the city level that defines the overall and zonal development of the city. Finally, the GUP was translated into one or more implementation or detailed urban plans (DUP), which minutely planned the implementation of GUP in a specific area of the city. In addition, small parts of the settlement, which were supposed to undergo substantial construction or reconstruction, could also be spatially arranged by drafting an urban project instead of a DUP.

[7] For small settlements a decision could have been made, which would have then replaced the urban plan (ZURPP, 1961).

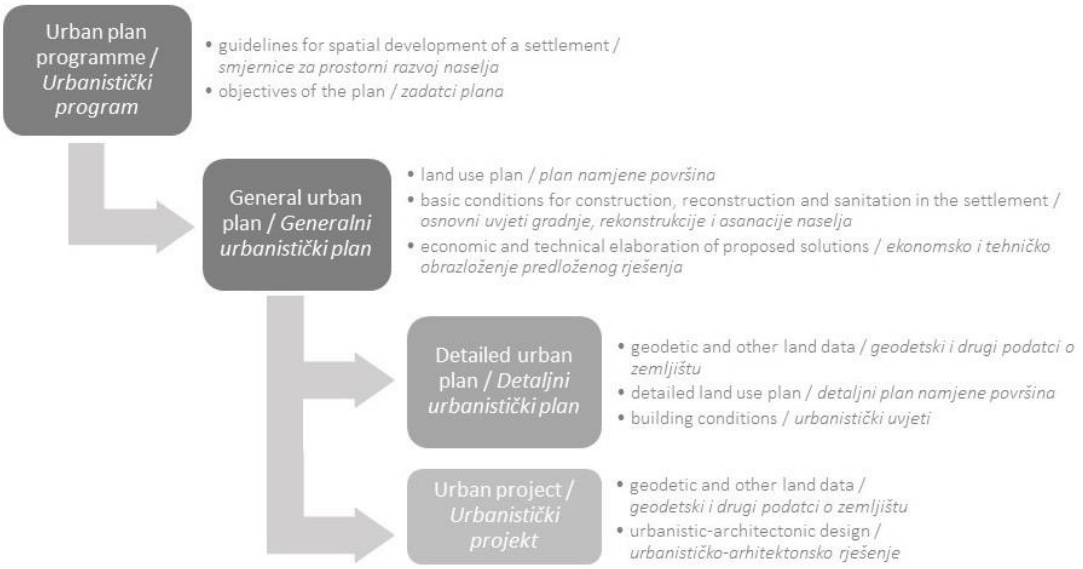

Fig. 1.4. Scheme of the urban planning document sequence according to the 1961 Urban and Regional Spatial Planning Act.

An urban plan, i.e. all of its elements, would be adopted by communal assemblies, after being drafted by a working organisation registered for urban planning activities. Plans had to be revisited at least every five years (ZURPP, 1961). However, although the republic urban planning acts in Yugoslavia were carefully drafted, their implementation was often hindered in practice. Branislav Piha (1973) speculated that the reasons for this were the lack of an urban planning culture, lack of awareness of the importance of organised and directed construction, conflicts between interested parties, etc.

Relation to societal planning

For the first time, urban planners had to analyse natural, social, and economic conditions in the planned territory to facilitate planning. The analysis results were part of the urban planning programme (ZURPP, 1961) and were supposed to support societal plans and economic development. Nevertheless, economic development slowed down in the 1960s and there was an economic crisis. As part of the resulting reform, the rationalisation of infrastructure

investments, and locational decisions were integrated into a renewed system of societal planning (Burton et al., 1966), changing the position of urban planning once again (Piha, 1973). Societal planning formally became an umbrella for all planning, and along with that the comprehensive planning system involved seven types of plans (federation, republic, regional, communal, plans of labour organisations and their associations) out of which the seventh type were physical plans (Rendulić, 1966). Spatial planning was definitively subordinated to social planning. The anticipated role of physical plans was, using long-term economic and demographic forecasts, to plan infrastructure, arrange optimal locations of basic economic capacities and social services and settlement networks, and inform the direction of urban planning and the urbanisation processes (Frković, 1966). In a way, the intended role of societal planning was the systematic networking of physical plans with federal financial plans and the economic plans of enterprises (Burton et al., 1966).

Political-institutional responsibility

The central government body responsible for spatial planning at the time was the Republic Bureau for Urban Planning, Housing, and Communal Affairs. Its primary role was to provide technical guidelines for plan drafting, to control compliance between different plans and subsequently to give consent to urban plans. On a local level, every commune had an administrative body responsible for urban planning which organised planning and plan implementation. At the beginning of the plan making process, that body was supposed to found a professional planning commission which would draft the urban planning programme and evaluated the subsequent planning phases (ZURPP, 1961). Furthermore, the trend of founding spatial planning bureaus in this period continued, and many urban communes gained their own bureaus (Piha, 1973).

Urban planners and policy

Following the tradition set in the pre-war period, urban planning in post-war Yugoslavia was still a technical rather than social discipline, dominated by architects, which was a cause of emerging criticism (J. C. Fisher, 1965; Lay, 1975). Over 65% of the staff of urban planning offices in Yugoslavia were architects (J. C. Fisher, 1965). This was true also for the UPIC, which, in 1962, consisted of mainly urban architects, horticultural architects, architectural technicians, and drafters with a smaller number of urban experts from different disciplines: economists; geographers; sociologists; professionals in the domains of housing and infrastructure; and cartographers (Premužić, 1962). The societal role of urban plans was hampered as planners received little or no training in psychology, sociology, and philosophy (Padgett, 1973). Consequently, plans were often technically faultless but failed to deliver a humanistic city that would advance the social environment, interactions, and individual contentment. Starting in the 1960s, professionals from other disciplines (economics, geography, sociology) were asked more frequently to participate in urban planning (Lay, 1975). Nevertheless, architects remained dominant in planning as urban planning was only taught in faculties of architecture (Piha, 1973).

Urban planning institutes remained influential professional bodies, which were employed by both domestic and foreign contractors to develop urban and regional plans. A notable example is the urban plan of Conakry, Guinea which was drafted by the UPIC in the early 1960s (Petrinović, 1962; Premužić, 1962). Most of the international activity was accomplished in non-aligned and developing countries. In domestic terms, one of the most important endeavours was the joint project between the United Nations and the (Yugoslav) federal government aimed at developing physical plans for the Adriatic Region between 1963 and 1972, in order to plan intensive urban development on the coast. As a result of the project, several cities were developed according to the urban plans and designs drafted by the UPIC, demonstrating an alternative to the emerging intensive, uncontrolled growth of holiday accommodation on the Adriatic coast (Salaj, 1988).

Plan execution

Once an urban plan was adopted, the planning commission was responsible for scheduling and monitoring its execution (ZURPP, 1961). The Commission collaborated with the communal fund for housing construction which defined housing policy and selected areas for residential expansion. In ideal cases, the office responsible for communal construction then prepared the land in selected areas for construction and equipped it with necessary utilities. Such offices were frequently founded in the 1960s as earlier experience showed that the lack of coordination in projection and construction of utilities often created a bottleneck in urban development (J. C. Fisher, 1965). In practice, however, this scenario was inverted: informal construction continued to be tolerated and even increased in coastal Croatia due to the growth of tourism. Such individual interests hindered the implementation of plans. The few examples of legal prosecution were long-lasting cases, which also had the effect of preventing the achievement of short-term planning goals (Dakić et al., 1972).

Public participation

In this period spatial planning outgrew the professional frame and became a social activity; spatial plans became objects of public interest and discussion (Piha, 1973). The act prescribed that communes had to ensure the participation of all interested workers' and other organisations in plan development, but in practice, plans were formulated in planning offices and did not involve public participation until the final stage (Pogačnik, 1987). Once the urban plan was finished, the commune displayed the proposal to the public and gave a deadline for comments (ZURPP, 1961). Remarks were expected from relevant organisations like local communities, voters' meetings and apartment house councils rather than from individual citizens (J. C. Fisher, 1965). In theory, planning reflected the intention to respect the plurality of spatial interests, and consensus between different interest groups was supposed to shape the final plan (Dabović et al., 2017).

In practice, public review rarely resulted in substantial changes and could never reject the proposal completely (Pogačnik, 1987). Despite the constitutional declaration of a 'classless society', in reality, certain interest groups and individuals such as builders and developers were usually powerful enough to influence plans in the drafting phase. Their impact was often most evident in DUPs which arranged concrete elements in space (Dakić et al., 1972). Other residents and groups could participate effectively only in the public display phase. If remarks targeted the concept or underlying principles of the proposed plan, the proposal was usually not altered. However, if remarks addressed issues that were not related to the fundamental concept of the plan, then they were often received more favourably, especially if the proposing group could secure necessary resources to carry out the suggested change(s) (J. C. Fisher, 1965). In the end, the decision on adoption and substantial change of plans most often depended on the support given by political bodies and developers who financed the projects (Pogačnik, 1987).

Environmental concerns

As a result of the 1957 Expropriation Act, many surfaces between buildings were designated as social property so they would not hinder any potential future land developments, and were left as grassy meadows. These areas, however, were often too small and inappropriate for development and burdened the communal budget for maintenance, leading to a lack of management (Marinović–Uzelac, 1993).

The act did not address environmental concerns, although it loosely stated that urban plan had to define the construction, reconstruction, and sanitation conditions for areas containing protected natural objects. In such legal settings, the elimination of adverse effects of fast urban growth on the environment was questionable (Petrović, 1971), depending on planners' individual stances towards such issues. However, even though not legally binding, some environmental issues were usually considered to some degree since residents

had the right to appeal if the plan would result in increased local traffic noise or air pollution (Pogačnik, 1987).

The period of "2000" plans (1973–1980)

The reforms of the mid-1960s did not improve the situation. Yugoslavia was faced with increasing unemployment and poverty, economic emigration, as well as national uprisings (Benson, 2004). In order to ease the situation, the communist party issued a new constitution in 1974 which increased the republics' autonomy and strengthened the self-management system by reorganising it and further extending the powers and responsibilities of communes. All institutions and organisations providing public services such as health, education, transport, etc. were transformed into self-managed interest communities (SMICs), which operated across different levels—from local communities through communes to republics. Workers organisations and enterprises were transformed into organisations of associated labour (OALs) (Grbić, 1975; Simmie & Hale, 1978). Urban planning began to change as well and to depart from post-war internationalism (Premerl, 1986). New legislation was developed along with the constitutional changes and included the principles of the previous societal planning system reform. Consequently, urban plans were developed systematically to cover a long-term period, serving as a basis for societal planning.

Legislation

The term "urban planning" was removed from the title of the new act, issued in 1973 and replaced with the term "spatial planning". The act more clearly elaborated the system of physical planning documents than the previous acts and combined physical planning with construction. The novelty was the system of physical plans divided into development (long-term: 20–30 years) and implementation (short-term) plans. Development plans covered different spatial scales—from republic, through regional and communal, to the urban settlement

level. Urban plans covered the lowest spatial level (excluding plans for areas of special purpose) and were adopted for cities and larger settlements. That was also the only level for which implementation plans were projected (ZPUKGZ, 1973).

The sequence of urban plan documents was changed. The category of *urban planning programme* was replaced by a category called *spatial development conception*, and this was not mandatory. However, the act suggests that cities of regional importance, such as Zagreb or Split, Zadar, Varaždin, etc., should draft 'conceptions' before making GUP[8]. Similarly the DUP was replaced by implementation urban plan (IUP) which could also be developed in two phases, where the first part was the programme for drafting the DUP. The content of the urban plan, i.e. its components, was defined more thoroughly than in previous laws. Another novelty was that an urban plan could also cover the undeveloped area surrounding a city, which was anticipated to be developed over the planned period (ZPUKGZ, 1973) (Fig. 1.5).

Relation to societal planning

Following the societal planning reform from the previous decade, the new act anchored urban planning in the system of societal planning. The act defined that the OALs drafting an urban plan had to collaborate with bodies and organisations in charge of societal planning. Moreover, urban plans had to be revisited every five years to ensure compliance with societal and other plans (ZPUKGZ, 1973). The system of societal planning was further arranged by the 1976 federal Act on Foundations of the Planning System and the Societal Plan of Yugoslavia, and the 1978 Act on Societal Planning in SR Croatia. In light of these changes, many urban planning bureaus were transformed into societal planning bureaus (Dabović et al., 2017).

[8] In the act, GUP was mentioned only in the article that suggests drafting the conception which precedes it. In all other articles the development plan of a city was called an urban plan.

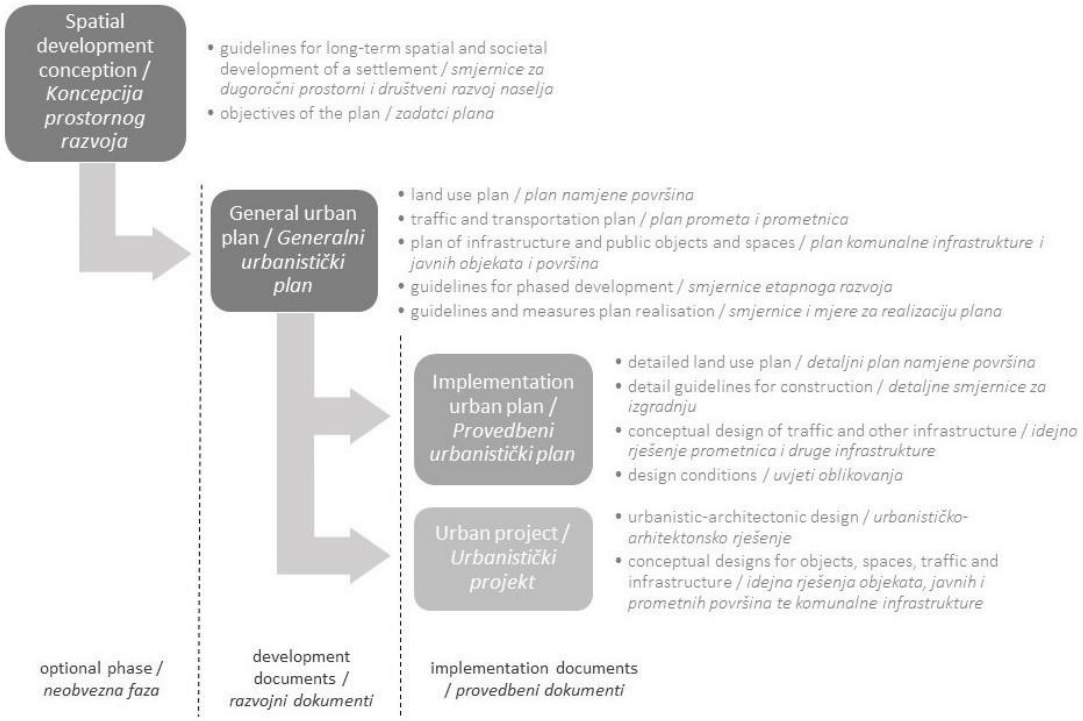

Fig. 1.5. Scheme of the urban planning document sequence according to the 1973 Physical Planning and Construction Land Use Act.

In a way, various societal and urban plans were considered as plans and goals for building a socialist society (Franković, 1985). In line with that, in the 1970s, many cities brought out so-called "2000" urban plans which were supposed to conform with the legal premise of long-term plans (Pogačnik, 1987). Furthermore, regional and republic plans had to be adopted, which, among other aspects, considered the possible variants of the overall urban system. The Spatial plan of the SR Croatia from 1974 thus considered the following three variants: 1) concentration of population and central functions in the centres of the Zagreb, Split, Rijeka, and Osijek macro-regions; 2) a disperse system of central settlements and population; and 3) a mid-variant—the latter was considered optimal (Radeljak, 2012).

Political-institutional responsibility

In institutional terms, the new legislation did not bring significant change. Communes remained the initial level at which urban planning was conducted, as urban plan making was considered part of a communes' self-management (Simmie, 1989). Before adoption, communes had to submit their urban plans to the republic body responsible for urban planning which evaluated the plan's compliance with other spatial and societal plans, technical urban planning standards, and planning legislation (ZPUKGZ, 1973).

Urban planners and policy

For the first time, the legislation prescribed which organisations could draft plans in terms of the staff they must possess. These were primarily OALs registered for planning that employed at least two architects and six professionals from other relevant disciplines (economics, traffic engineering, infrastructure, etc.). Except for OALs, urban plans could also be drafted by academic institutions (ZPUKGZ, 1973). Work in the interdisciplinary team was not, however, always successful due to the lack of planning education outside of architecture faculties as well as different viewpoints originating from different disciplines (Pogačnik, 1987).

Nevertheless, many spatial planning organisations (UPIC, Zagreb Urban Planning Bureau, Dalmatia Urban Planning Bureau, Zadar Urban Planning Bureau, Đakovo Urban Planning Bureau, Rijeka Urban Planning Bureau, Osijek Urban Planning Bureau, URBIS Pula) already employed assorted professionals and offered various services. Further, OALs could act as consultants to both public and private organisations in need of urban planning services (Simmie, 1989). In the light of legislation changes, the UPIC organised professional seminars in Zadar and Zagreb in 1973 and 1974 on the development and drafting of plans under the new socio-political conditions. The UPIC retained the role of the innovator in the methodology of planning documents as well as planning-related studies (Salaj, 1988).

Plan execution

Long-term urban plans were realised through short-term IUPs and, in special cases, by urban projects. These documents defined technical planning conditions for development, construction, reconstruction and sanitation of the planned area. In contrast to the IUP which concerned an area (or its part) that was covered by the GUP, the urban projects could relate only to small parts of the city, which were supposed to undergo substantial construction or reconstruction (ZPUKGZ, 1973). Regarding informal construction, it continued to be tolerated and, consequently, hindered normal execution of urban plans.

Public participation

The 1973 Act defined spatial planning as a right and obligation of socio-political communities, primarily communes. Subsequently, the communal assembly was obliged to ensure the participation of local communities, OALs, SMICs, and residents in the decision-making process regarding the urban plan. Furthermore, the Act prescribed that an IUP proposal had to be discussed in the local community before it could be adopted. This meant that local communities could act as pressure groups in matters like housing, communal services, child and social welfare, education, culture, physical education, consumer protection, etc. (Simmie, 1989). By involving different stakeholders in the planning process, the planners' role shifted somewhat to finding a balance between different land-use needs and pressures and proposing alternatives (Pogačnik, 1987). The final proposal of both the urban plan and IUP had to be publicly displayed for at least 30 days and open for comments at least 45 days. Every remark had to be considered and an explanation provided in the event of its rejection (ZPUKGZ, 1973).

Environmental concerns

The global expansion of environmental movement in the 1960s did not bypass Yugoslavia, where environmentalism started infiltrating both science and policy. The United Nation's efforts were recognised at the political level and a conference was held in Zagreb in 1972 on the occasion of Yugoslavia joining the Man and the Biosphere Programme. Its conclusion was the need to strengthen environmental protection in Yugoslavia (Branica, 1974; Lay, 1975). This was reflected in the new Act (1973) which dedicated almost a fifth of its articles to protection and advancement of the human environment. Many environmental aspects, such as the protection of natural resources, and the use and maintenance of public spaces and private gardens, were supposed to be regulated by IUPs. Moreover, urban green space was considered important for protection from air and noise pollution, and natural ventilation (ZPUKGZ, 1973).

The 1970s also brought a shift towards research in the UPIC, which focused on exploring the relationship between cities, planning and environmental protection. In collaboration with other research organisations, the UPIC came up with planning approaches for establishing ecological balance in space and local nature protection (Salaj, 1988).

The period of non-expansive urban planning (1980–1991)

The last decade of the socialist period can be considered as the beginning of the transition process, which accumulated in the late 1980s and culminated in the 1990s. Despite various economic and political reforms, the situation in Yugoslavia worsened throughout the 1970s. The deaths of key political figures in 1979 (Edvard Kardelj) and 1980 (Josip Broz Tito) were heralds of the demise of the socialist regime. The new leaders were more inclined toward nationalism than socialism (Benson, 2004), which led to the violent disintegration of Yugoslavia in 1991. In the meantime, the long-term planning perspective defined in the 1973 Act turned out to be limited. The "2000" plans resembled "large-scale projects" difficult to achieve and indicated that a more flexible approach had to

be used (UZGZ, 1985). Part of the changing perspective was also the process of slowing urban growth, with more urban renewal rather than spatial expansion.

Legislation

The planning acts of the 1970s proved inadequate, so new legislation was adopted in the early 1980s. In the new law, physical planning and construction were divided into separate acts. The Physical Planning and Spatial Organisation Act (ZPPUP, 1980) was considerably shorter than the previous one, and it defined two types of city plans—GUP and implementation urban plan (IUP), with an option of passing other types of plans as well (Fig. 1.6). The act equated GUPs with urban plans drafted according to the act of 1973, which would remain valid if updated. Other types of plans could be urban projects, infrastructural plans, etc.

For the first time, certain aspects of planning were regulated by official rulebooks. The 1980 Act prescribed that the detailed regulations on the content and form of plans as well as spatial standards and norms would be issued by the republican body responsible for planning within a year of the Act's passing, but this was not done until 1985. Plans made between 1980 and 1985 were therefore incomplete and had to be modified once the rulebook was issued (Poropat et al., 2006).

Relation to societal planning

The 1980 Act set spatial planning as part of the singular system of societal planning, with the role of directing spatial distribution and ensuring compliance of all functions in space for the sake of achieving the goals and interests of socio-economic development of a given area. The next federal reform of the societal planning system, adopted in the act of 1985, strengthened the role of spatial planning, which resulted in the production of implementation plans oriented around investments (Dabović et al., 2017). This so-called "investment urbanism" thrived in the first post-socialist decade due to the lack of budget funds in many cities (Djordjević & Dabović, 2009).

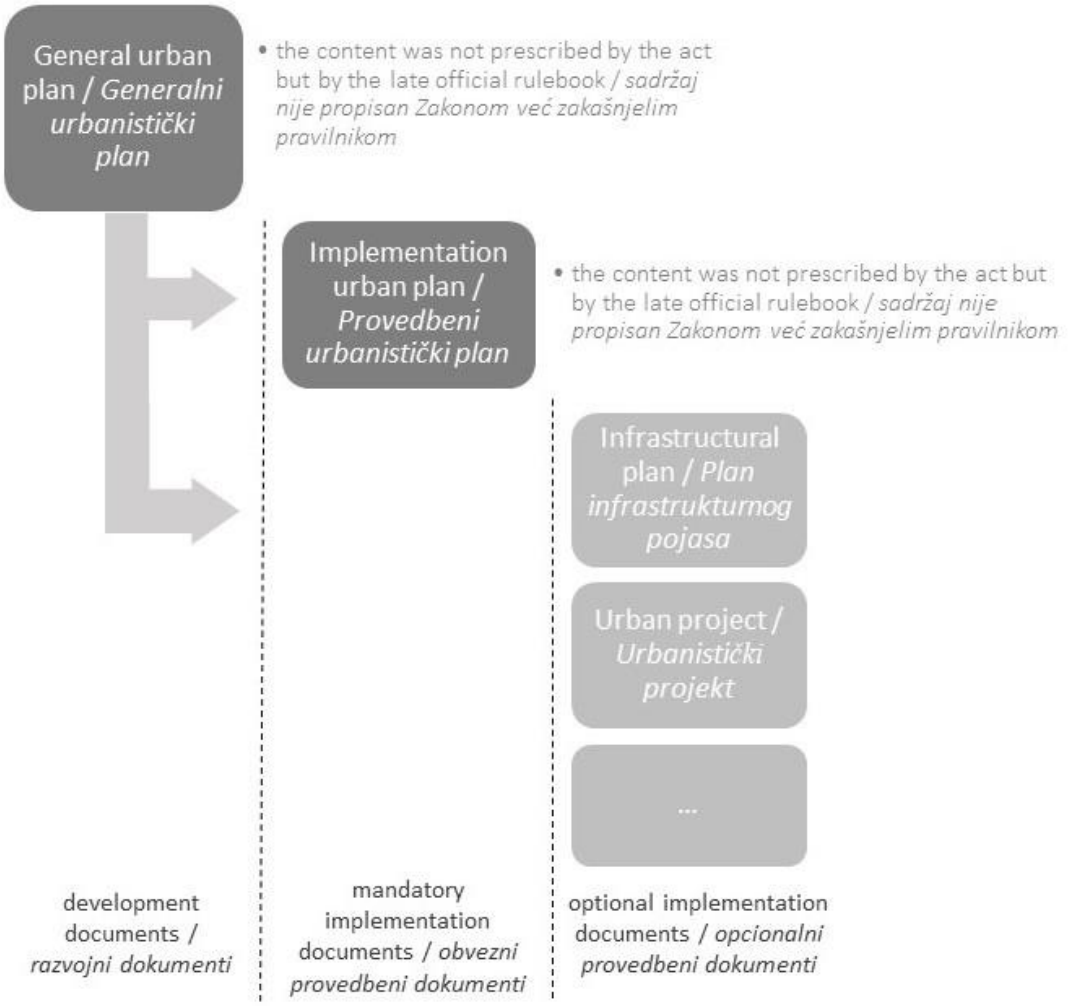

Fig. 1.6. Scheme of the urban planning documents sequence according to the 1980 Physical Planning and Spatial Organisation Act.

Political-institutional responsibility

The 1980 Act did not arrange the institutional framework for spatial and urban planning. There was, however, a provision that the republican body responsible for planning should bring additional, more detailed regulations on the planning process and documents. There was also still the provision that GUPs could not be adopted before obtaining the consent by the republic body responsible for spatial planning, which evaluated the compliance of the GUP with the relevant republican planning legislation.

Urban planners and policy

In contrast to the previous act, the one from 1980 did not specify the type of professional training that staff in plan-drafting organisations must have, only that they need to be registered for physical planning at the Ministry of Construction and Environmental Protection. However, the plans could also be drafted by administrative bodies founded for that purpose such as planning bureaus. Carrying out the most complex contemporary tasks, the UPIC began to organise its cadre thematically (housing, transport, tourism, recreation, etc.) in contrast to earlier disciplinary organisation. Furthermore, it shifted towards drafting plans that reassessed the earlier ambitious plans and attempted to settle spatial conflicts (Salaj, 1988).

Other aforementioned organisations, i.e. bureaus, unified within a group of spatial planning and design organisations (Koprojekt), as well as certain communal bureaus, continued to meaningfully contribute to the profession by drafting a large number of high-quality plans. A considerable number of experts continued supplementing knowledge from their disciplines (architecture, geography, construction, economics, sociology, etc.) at postgraduate programmes relating to urban, spatial and regional planning at the University of Zagreb's faculties of architecture and science, as well as in other republics and abroad. Heads of physical plan drafting processes could, apart from architects, also be experts from other disciplines, depending on the internal organisation acts (e.g. geographers, economists, etc.), and this was practiced in bureaus in Zagreb, Zadar and Split. However, the same was not true for urban planning intended for drafting GUPs and IUPs.

Plan execution

Long-term GUPs were realised through mid-term IUPs. After their adoption, cities had to monitor their implementation and modify the plans if they diverged from the spatial reality or social interests (1980). In practice, consistent plan execution was the main difficulty of the planning system as plans were

implemented by SMICs and OALs whose interests often diverged from those of plan-makers. Although cities formally controlled plan execution and issued permits for developers' projects, there were often departures from the official plan, and also unplanned land use, which were rarely sanctioned (Simmie, 1989).

Public participation

The role of local communities in the self-management system was strengthened. The Act (1980, Art. 4) stated that 'working people and citizens in local communities and workers in [OALs] and [SMICs] from the territory of the local community decide on the spatial organisation of settlement for the sake of exercising their common interests for life and work in the local community'. Moreover, the Act gave responsible bodies the obligation to ensure the participation of all users of space in the procedure of designing the spatial organisation policy.

The tradition of public exhibition of plans was continued and the general public was invited to express their opinions of proposals either in writing or at the equivalent of public examinations (Simmie, 1989). As in the previous period, the communal assembly was obligated to consider submitted remarks and opinions of local communities, OALs and SMICs and provide an explanation in the case of their dismissal. In theory, the consent of concerned local communities remained a decisive factor of adoption of IUPs.

Environmental concerns

The 1980 Act defined that all space users were obligated to use space in a way that would ensure conditions for the preservation and advancement of the environment and the prevention of adverse effects that could endanger the values of the human environment. As Radeljak (2012) noted from the 1989 Spatial plan of SR Croatia, environmental protection was an issue for official consideration, but in reality, local and party interests were given an advantage.

An example of a lack of both environmental considerations and respect for the local community's interests in practice can be found in the late-1980s case of large-scale residential construction in the then Dr. Mladen Stojanović local community (today called Jelenovac) in Zagreb (Štulhofer, 1991). Despite the local community's resistance to the project, which included the destruction of a woodland that was used for leisure and recreation and maintained the local ecological balance, the commune of Črnomerec was persistent in adopting and realising the IUP. In the end, the IUP was adopted despite the fact that the communal ombudsman for self-management had stated that the decision was invalid. The subsequent lawsuit, however, found in favour of the commune and the project was realised.

Concluding remarks

The socialist regime governed Croatia for almost half a century and the early goals of industrialisation, electrification, and urbanisation completely transformed the country in economic and social terms. The rich urban planning tradition of pre-war Croatia enabled the relatively rapid establishment of both urban and regional planning services and spatial planning policy in the 1950s. Over the second half of the 20th century, it helped to contribute to the resolution of pressing issues and, as Eugen Franković (1985) remarked, urban planning was considered as a spatial aspect of planning the socialist society.

Socialist planning evolved in a close relationship with the development of socialist ideology (Bojić, 2018). From the very beginning, urban planning was seen as vital for helping to create conditions for economic development. Until the mid-1960s, societal and five-year plans facilitated some of the most dynamic economic growth in the world (Dabović et al., 2017). Following the societal planning system reform in the 1960s, urban planning formally became a part of societal planning and its economic role was further emphasised. The 1970s brought change in the titles of legislation where spatial planning was given the central place and urban planning started being treated as a component thereof.

In practice, urban planning remained the basic level of planning with a diverse variety of plans and its regulations had direct influence on people's lives and living conditions.

Frequent reforms, political and economic, characterised the socialist period and had a profound impact on urban planning. The peculiar course of events whereby urban planning acts (in Croatia) were regularly adopted just before essential systemic reforms that introduced relevant changes is interesting. The first federal planning regulation was adopted in 1949, just two years before the introduction of the self-management system. Then again, the urban planning act of 1961 preceded the constitutional reform of 1963 and the economic and societal planning system reforms of the mid-1960s. The same happened with the 1973 planning act, which was implemented just a year before the new constitution. Since each reform initiated subsequent societal planning system reform, urban planning was practised in ever-changing conditions.

Political and economic decentralisation and subordinance to the societal planning system had both positive and negative sides for urban planning. While decentralisation enabled more adjustment of plans to local natural and socio-economic specificities, it also decreased control over the planning and implementation processes, which in turn allowed illegal developments. In practice, there was a considerable amount of unplanned building and construction, which in one way assisted economic and social development but in another hindered rational planning. Urban planners had very limited abilities to invoke higher-level authorities (e.g. republican or federal) to sanction the neglect of plans. It is therefore not surprising that socialist planners often argued that many spatial problems could be solved by enhancing the role of technical planning instead of decentralising the planning system (Simmie, 1989). On the other hand, the subordination of urban to societal planning reduced the freedom of planners to implement practical over political solutions. In that sense, despite their relative freedom in the urban planning sector, they were still ultimately subordinate to politics (Seferagić, 2007).

Although some early plans paid considerable attention to the provision of public open space, environmental factors did not become an important part of urban planning until the 1970s. Only then were environmental concerns, along with nature-based solutions for pollution and risks, introduced into planning legislation as natural values worth preserving. Despite relatively advanced legal coverage, in practice, environmental protection remained subjugated to private interests and authorities often legitimised it by either giving permission to private investors' risky projects or turning a blind eye to informal development.

An important legacy of the socialist system was legal urban planning procedures and tools that are still used in modern Croatia. After its introduction in 1949, the general urban plan has remained the main document of urban planning to date, with the "semi-exception" of the 1970s when it was called an urban plan but was equated with the GUP adopted in both earlier and later decades. The detailed urban plan has also been an important legacy of socialist planning. Furthermore, even though they were made by the socialist government, the urban/spatial planning acts were oriented practically rather than ideologically, which is why the act of 1980 (with amendments) was used through 1994 (several years after Croatia's declaration of independence from Yugoslavia in 1991). Furthermore, socialist planners continued cultivating a century-long tradition of active engagement with western planning theories and methods, due to which Croatian planning did not lag behind Western Europe or the USA. Moreover, some advanced practices such as public display and participation and environmental concerns were introduced (at least legally) around the same time as in western planning. On the other hand, multidisciplinarity was delayed by several decades. Modern Croatian urban planning has continued to cultivate all practices inherited from the socialist period, and developed them further.

Given that many Croatian cities experienced the greatest growth in the post-war period, their contemporary form and structure reflect socialist plans considerably. We hope that providing the fundamental context in which these plans were made may serve planners to understand why modern cities look and function as they do and which barriers and opportunities they pose for today's

urban planners. Moreover, we hope that the displayed evolution of planning practices may encourage planners to critically consider the current state of these practices and undertake steps towards further advancing them in their own work.

The end of PAPER I.

1.5. Critical review of urban planning in post-socialist Croatia

> *"What kind of activity and what kind of actors indulge private investors for their own interest (…) disregarding interests of citizens, and working against them and against the cities in which they operate?! Is that a* new urbanism *compliant with postmodernist neoliberal society and its rules, or is it the* death of urbanism *as an activity?!"*
>
> **Dušica Seferagić** (2007, p. 371),
> urban sociologist in Zagreb

The transition to political pluralism and market economy after 1990 was a long and slow process that may still not have finished. Adoption of new legislative acts was aggravated by wartime conditions so that the 1980 Act regulated urban planning until 1994, and the GUPs made in the socialist period remained in force in many cities until the early 2000s. The new Constitution of the Republic of Croatia (Ustav Republike Hrvatske, 1990) outlined physical and urban planning as the self-governing right of citizens. In reality, physical and urban planning lost much of its power, which was both legally and covertly transferred to political elites and private investors (Seferagić, 2007). Latter legislation (ZPU, 2013; ZPUG, 2007) somewhat advanced urban planning regulation. While different levels of urban plans were prescribed in all post-socialist acts, the term *urban planning* was not mentioned in any of them.

The systematisation of urban planning documents often changed across the period. The first Physical Planning Act (ZPU, 1994) replaced GUP with a general physical plan as an attempt to distance planning from its socialist legacy. However, the decades of drafting GUPs could not be just disregarded in practice, and the 1998 amendments to the 1994 Act reinstated GUP as the main urban planning document. The 2007 Act removed it again, only to be restored once

more by the 2013 Act. The 1998 amendments also introduced urban development plans (UDPs), which would assume the roles of both GUPs and detailed development plans (DDPs) in the following periods, depending on contemporary legal definitions. In addition, the 1994 Act allowed the adoption of so-called 'other physical plans', which city authorities used to regulate various planning aspects, omitting any kind of public participation (Mrak–Taritaš, 2008). This provision was revoked in 1998 amendments to the act.

1.5.1. Speculative privatisation and deregulation of planning

After the 1990 Constitution reintroduced private property, one of the first steps of the independent Croatian government was the transformation of socially-owned lands and enterprises[9] into the national property to gain control over them and be able to privatise them (Šokčević & Dugalić, 2007). This had immense implications for urban planning, which had been facilitated by the absence of land ownership issues in the socialist period. The then dean of the Faculty of Architecture in Zagreb, Ante Marinović–Uzelac (1993), warned that the outdated socialist understanding of urbanism, with rigid planning methods attuned to social property, would disable any reform needed for the introduction of the market economy. Politically-driven privatisation facilitated the transfer of public assets into the private ownership of physical or legal persons for an often questionable price (Šokčević & Dugalić, 2007).

The privatisation of national property that coincided with the economic crisis and inflation due to the wartime conditions suppressed the real estate market, allowing those with capital to obtain both public and private properties at low prices. The number of public assets subjected to privatisation and the weak regulation of the process created numerous openings for corruption, land

[9] The people's property that originated through expropriation and nationalisation in the first decade of the socialist regime was transformed into social property by the 1953 Constitution, when the self-management system became a constitutional pillar of Yugoslav society.

speculation and illegal construction, which flourished in the first decades of the post-socialist period (Cavrić & Nedović–Budić, 2007). The private investors' interest in obtaining a public land plot for construction was often facilitated by national and local authorities bending the laws and rules of the planning profession if there was a personal gain for them, even if investors would usurp public spaces, destroy protected monuments and construct buildings (Cavrić, 2009; Seferagić, 2007; Svirčić Gotovac, 2009). Indeed, some argue that the transition to market-driven urban development resulted in entropic spatial disorder (Blau & Rupnik, 2007).

1.5.2. Democratic pluralism and the illusion of public participation

Disregarding the level of public participation reached in the socialist planning acts, the post-socialist legislation started from scratch. In contrast to the glorification of pluralism and consideration of public opinion in the 1990s, the 1994 Act did not prescribe any form of public participation in drafting or adopting planning documents. Only the 1998 amendments re-introduced the mandatory public hearings for the creation of UDPs. However, public scrutiny was incorporated only formally, with limited influence on land-development decisions. The professional and lay public could only express the ideas, suggestions, and critiques during discussions of the draft and the final planning documents (Cavrić & Nedović–Budić, 2007). Formal public participation was further anchored by the 2007 and 2013 acts, as an attempt to abide by international guidelines calling for the inclusion of the public in drafting processes and transparency in the selection of planning solutions (Mrak–Taritaš, 2008).

Whereas the legislation schematised a 'planning stakeholder quadrangle', in practice, the public was often omitted, reducing the quadrangle to the *local political and institutional actors–developers–professionals* triangle (Seferagić, 2007). Cavrić and Nedović–Budić (2007) found that institutional and other actors usually perceived the public as insufficiently objective and utterly incompetent

participants. Public hearings on urban plans proposals resulted in hundreds or thousands of members of the public requesting to convert their private land into building plots (e.g. Doklestić, 2015). Such building plots were much more valuable than non-construction land and owners were encouraged in the 1990s by political elites to sell their land in this way. This was legitimised through the notion that acting for one's own benefit contributes to the general development of community (Seferagić, 2007).

Cavrić and Nedović–Budić (2007) argued that even in the planning triangle, some stakeholders were more influential: builders and architects over other space- and planning-related professions. Consequently, planning lacked an interdisciplinary approach and did not result in sustainable practices, social diversity and justice, nor stewardship over natural and environmental resources. The devalued planning principles further aggravated this because architects and urban planners would draft what investors dictated, even when that went against the rules of the planning profession (Doklestić, 2015; Seferagić, 2007). Planning was increasingly dominated by a legal-based approach and became less creative (Savjet prostornog uređenja Države, 2006). Consequently, the planning offices once led by urban planners were increasingly headed by jurists capable of finding legal foundations for various spatial interventions (Doklestić, 2015).

1.5.3. 'Investor' urbanism: derogation of public interest

The dominance of private property and market-led urban development made investors the most influential planning actors (Gulin Zrnić & Vranić, 2015). In contrast to socialist investors, which referred to self-managing firms and enterprises that were legally recognised as organisations of associated labour (OALs), post-socialist investors are owned by individuals with private capital. The government made urban planning overly flexible to accommodate private investors' wishes, enabling adjustments to the planning documents on a case-by-case basis (Cavrić & Nedović–Budić, 2007; Gulin Zrnić & Vranić, 2015). Over the last three decades, GUPs have been amended so frequently that their long-range

dimension has been lost to short-term goals (Gulin Zrnić & Vranić, 2015). The power of capital (and its covert flow into decision-makers 'pockets') subdued urban planning, which some planners and academics thus named *investor urbanism* (Doklestić, 2015; Svirčić Gotovac, 2010). Namely, if private investors showed interest in land plots reserved for public land use, political elites often found ways of satisfying such interests (Slavuj et al., 2009). Local authorities would amend the adopted plans to accommodate the wishes of private investors, even when these jeopardised public interests (Svirčić Gotovac, 2010).

The 2007 Act boosted private initiatives by allowing land developers to finance a portion or entire cost of drafting a UDP or DDP required for development on land plots they owned. This raises the question of payers' requests regarding the provisions in those plans. Knežević (2003) argued that the post-socialist ideology inherently allowed private interests to prevail over public interests, legitimising this by omitting to prescribe instruments for legal protection of public interest. The farsightedness of socialist planners reflected in planning spaces for social purposes in neighbourhoods, which were not implemented due to the lack of funds, became a mitigating circumstance in the post-socialist period when these empty spaces were filled with two distinct types of buildings—churches and shopping centres (Šimpraga, 2012). Already in the 1990s, residents and activists started protesting against such projects, and both politicians and private investors would accuse protesters of being opponents of development and modernisation (Seferagić, 2007). However, their determination and success rate only grew over time (Šimpraga, 2011; Slavuj et al., 2009), and over the last decade, they achieved important victories defending public interest (Svirčić Gotovac & Zlatar Gamberožić, 2020).

1.5.4. 'Dotted' urbanism: location permits and failed land consolidation

In contrast to the socialist period when most of the urban area was social property entrusted to the communist party for governance, the highly fragmented mosaic of public and private properties after 1991 hampered

comprehensive urban planning. Whereas socialist (and even pre-socialist) urban planners used to envision cities as wholes, in the post-socialist period, their role was reduced to the bureaucratic facilitation of private investors' ideas (Gulin Zrnić & Vranić, 2015). That was reflected in GUP, which regressed from the long-term conception of harmonised urban development into a frequently amendable land-use plan viewing the city as a group of more or less available and marketable real estates (Sevšek & Marčetić, 2015). Limited by the new spatial structure of land ownership, urban planners planned only public sites and plots for which private investors expressed interest while prescribing only minor, barely significant rules for sections of private lands. Hence, planners and academics sometimes describe post-socialist planning in Croatia as *dotted urbanism* (Seferagić, 2007; Zlatar Gamberožić, 2016).

The 'dotted' urban planning was facilitated by the *location permit* instrument, which is issued only when intervention in space is compliant with the competent plan. However, the instrument was criticised for being used as a substitute for drafting DDPs, which contrasted with planning practices across the European Union (Cavrić & Nedović–Budić, 2007). Unlike detailed plans that systematically prescribe land use, location permits allow case-by-case consideration by the city administrations, making space for corruption that has been widespread in Croatia. This resulted in a construction *boom* that happened in large cities in this period (Mrduljaš & Horvat, 2008).

An important step towards more comprehensive urban planning was intended in the 2007 Act, which introduced the instrument of *land consolidation*. This enabled construction land plots to be merged into a single whole and its subsequent division into construction and other land plots following detailed plans. The initial landowners would acquire new land plots in accordance with their original share proportionally reduced by the area set aside for public land use. This instrument was used ordinarily in the socialist period as part of the urban land expropriation; however, it failed to be revived in the post-socialist settings. Its implementation was largely delayed and criticised for insufficient consideration of effects on constitutionally guaranteed property rights (Tuhtan

Grgić, 2011). Consequently, it was removed from the 2013 Act, except in instances where the process of land consolidation had already begun.

1.5.5. Urbanism is dead?

Considering the achievements of socialist urban planning, many Croatian urban planners, academics and critics in the 21st century have argued that *urbanism is dead* (Seferagić, 2007; Svirčić Gotovac, 2009). In Croatia, as well as globally (Koolhaas, 1995), it is claimed that the architect's location-bound thinking space, which is more compliant with *investor* i.e. *dotted urbanism*, replaced a planning perspective in the postmodernist period. This was reflected in the disciplinary diversity of planning offices as well. In contrast to the socialist period when professionals of various backgrounds had been increasingly invited to planning teams over time (see e.g. GUP, 1971, 1986), after 1991, planning offices were dominated by architects. Moreover, this was facilitated by legislation that called for involving other professions only as needed. For that very reason, Cavrić and Nedović–Budić (2007) argue that Croatian urban planning was reduced to physical land use planning, leaving other aspects of urban development behind. The problems of postmodernist urban planning are not exclusive to Croatia and are outlined across the post-socialist countries in Europe (Hirt, 2013). Some solutions to revive urbanism might be found in individual cases where the city authorities embraced and stimulated novel planning approaches, such as in Ljubljana (Svirčić Gotovac & Kerbler, 2019) or Berlin (Thierfelder & Kabisch, 2016).

2. Concepts and methodology

"All human knowledge begins with intuitions, proceeds from thence to concepts, and ends with ideas."

Immanuel Kant (1787, p. 730),
Enlightenment philosopher

The first sections of this chapter discuss concepts of urban nature and cultural ecosystem services, providing a rationale for the selection of concepts that inform the analytical framework of this thesis. Section 2.2 goes beyond reviewing the CES concept and devises a framework for planning for urban CES that is suitable for both practical and research purposes. Section 2.3 positions this study in relation to the reviewed knowledge and outlines the gaps and directions this study will address and help overcome. Finally, the methodological framework is outlined in section 2.4.

2.1. Concepts of urban nature

> *"So, we routinely consider nature to be somewhere else: it's something we travel to, visit or dwell in prior to returning to our 'unnatural' towns and cities."*
>
> **Noel Castree** (2014, p. 12), environmental geographer

Urban nature is a general, neutral term that is often used but rarely defined in the literature. It usually covers all natural and semi-natural elements of the urban landscape (e.g. Barthel, 2008; McEwan et al., 2020). Contemporary western societies hold four principal meanings of the word 'nature': *external nature* (non-human world), *universal nature* (entire physical world including humans), *intrinsic nature* (defining features of living and inanimate phenomena), and *super-ordinate nature* (the power, force or organising principle animating living and inanimate phenomena) (Castree, 2014). Urban nature complies at least partly with each of these meanings. Yet, some authors argue that urban nature is only a kind of mimicry of nature within a cultural environment, which nonetheless performs its function (reflected in the four meanings) successfully despite its apparent reductionism (Kos, 2008). This demonstrates the difference between ontological and functional views of urban nature. In the urban planning domain, the functional definition of urban nature would therefore facilitate its handling much more than the ontological definition. Yet, it would be wise for planners to remind themselves of the ontological views of nature to evade its excessive instrumentalisation (Loreau, 2010).

In Western countries, where a majority of people spend most of their time in built environments, urban nature can accommodate their felt need for 'escape'

(Castree, 2014). In addition, it provides people with multisensory experiences which they value (Dickinson & Hobbs, 2017). The inherent need for interactions with nature are embodied in the *biophilia hypothesis*, which states that human evolution in nature resulted in adaptations that make us likely to function well when exposed to natural environments (Wilson, 1984). Some studies indicate that urban dwellers prefer urban nature sites that they perceive as more natural in contrast to those more designed (Hoyle et al., 2019). Yet, the perception of naturalness is largely a reflection of the cultural construct of nature and does not correspond with the level of biodiversity, wildlife or pristineness (Hoyle et al., 2019; Ives, Oke, et al., 2017; Kaplan et al., 1972).

Urban nature is, therefore, a multifold concept with many aspects to consider by urban planners and decision-makers. In order to make it more practically relevant, researchers increasingly use more precise concepts such as 'urban green space', 'urban green infrastructure', 'urban blue space', and 'urban blue infrastructure', or a unifying concept of 'urban green and blue space'.

2.1.1. Urban green and blue spaces

Like the notion of urban nature, *urban green space* is rarely explicitly defined. Instead, authors usually list the spatial elements it comprises: "urban green space (UGS) can range from remnants of vegetation (such as conservation reserves) through to purposefully created and intensively managed areas like parks and playing fields" (Dickinson & Hobbs, 2017, p. 180). Some authors use publicness as a defining criterion. Schipperijn et al. (2013, p. 110) define UGS as "all publicly owned and publicly accessible open space with a high degree of cover by vegetation". For others, both public and private green spaces compose UGS (Beer et al., 2003; Lishchynskyy et al., 2021). The UGS concept is increasingly integrated with other related concepts such as ecosystem services (Dickinson & Hobbs, 2017; Dushkova et al., 2020), climate change adaptation (C. Davies et al., 2017; Nero et al., 2017), urban resilience (Colding & Barthel, 2013) and reconnecting people with nature (Middle et al., 2014).

Urban blue space (UBS) includes all visible surface waters in urban areas (Völker & Kistemann, 2011, 2013). It is usually defined by its form, e.g. "oceans, lakes, and rivers, as well as smaller water features such as fountains and streams" (Finlay et al., 2015, p. 98). Some publications include UBS within UGS. For instance, a review of links between UGS and health by WHO (2016, p. 3) states that UGS "may also include 'blue space' which represents water elements ranging from ponds to coastal zones." However, Völker and Kistemann (2011) advocate their separate classification, arguing that UBS have different, more favourable physical effects on beneficiaries than nearby UGS.

The literature increasingly refers to *urban green and blue spaces* (UGBS) as an umbrella concept (Iojă et al., 2018; Yen et al., 2021). Such a unified approach is useful considering that many urban ecosystems consist of both green and blue components (e.g. parks that include streams or lakes or urban beaches where the sea is an inseparable component of experience). The UGBS concept comprehensively covers the urban nature sites and allows studies of their integrated effects on human wellbeing, urban resilience and other related social-ecological processes. UGBS gained visibility during the COVID-19 pandemic lockdown when numerous studies affirmed their beneficial effects for both physical and mental health in cities (Lopez et al., 2021; Pouso et al., 2021).

2.1.2. Urban green and blue infrastructure

Addressing structures that facilitate the operation of society, environmental literature often distinguishes between grey and green infrastructures, which may be mutually complementary or considered alternatives (Honeck et al., 2020; Lafortezza et al., 2017). Although there is still no generally accepted definition of green infrastructure (Lafortezza et al., 2017), it usually refers to natural and semi-natural structures that benefit society, in contrast to built and engineered structures that make up the conventional, grey infrastructure. Some authors outline green infrastructure as broad as UGS, while others follow the European Commission (2013, p. 3), which defined it as "a strategically planned network of

high quality natural and semi-natural areas with other environmental features, which is designed and managed to deliver a wide range of ecosystem services and protect biodiversity in both rural and urban settings." In this sense, *urban green infrastructure* is a subset of green infrastructure located in urban areas. As with UGS, some authors include various water spaces in green infrastructure (e.g. Dall'O', 2020; Pulighe et al., 2016), whereas others discern between green and blue infrastructure, introducing the integrated concept of *urban green and blue infrastructure* (Andersson et al., 2019; O'Donnell et al., 2021).

2.1.3. Urban nature forms in Zagreb

Socialist regimes provided abundant urban nature areas across Eastern Europe due to strict spatial planning regulations (Hirt, 2013); this was true for Yugoslav cities as well (Krajter Ostoić et al., 2017). Green spaces were not only developed to provide recreation opportunities and health benefits but also to regulate people's attitudes towards the environment (Djokić et al., 2018). In Zagreb, the green spaces are diverse and include public parks, green-blue recreational complexes, decorative green strips and patches, and green spaces in-between housing buildings. In addition, collectively managed gardens originated informally at the margins of many neighbourhoods. Such a broad range of planned and non-planned urban nature forms does not adhere to the European Commission's definition of green infrastructure. I have therefore selected the UGBS concept for this study. Furthermore, as water spaces have been an essential component of several planned parks and recreation complexes, I examine both green and blue spaces. Consequently, the examined UGBS include public UGS and UBS and wild and/or neglected lands that may have been owned privately but used as public land.

2.2. Concept of cultural ecosystem services in the planning context

> *"Cultural ecosystem services are not, it seems, external components of nature awaiting discovery and allocation by people, like wood is placed in the hearth, or food and water is ingested. Instead, they are typically constructed, intangible and interpretative in character and emerge out of the relations between the non-human and human."*
>
> **Robert Fish**, **Andrew Church** and **Michael Winter** (2016, p. 210), creators of the CES research framework

This section is written as a review article, which was published in *Journal of Urban Ecology* in 2020.

In the paper, we first critically review the characteristics of CES and their effect on CES' integration into urban planning. Building on this review, we appose the challenging features and solutions proposed in the literature to design a scheme for integrating CES into urban planning by reconciling the challenges and harness the distinctive qualities of CES. We propose and elaborate a strategy applicable in practice that, at the same time, is suited for examining the planning for CES. The overall methodological framework of this thesis uses the proposed strategy for exploring the historical and contemporary provision of CES in Zagreb. Parenthetically, the strategy was tested in the empirical chapters/papers yielding valuable insights about its research application and conceptual settings.

PAPER II

Can we plan for urban cultural ecosystem services?

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Status of the paper: **published**

Reference:

Tandarić, N., Ives, C. D., & Watkins, C. (2020). Can we plan for urban cultural ecosystem services? *Journal of Urban Ecology*, *6*(1), juaa016. https://doi.org/10.1093/jue/juaa016

Abstract

Despite being intangible, subjective, and difficult to measure, cultural ecosystem services (CES) are more comprehensible and meaningful to people than many other services. They contribute greatly to the quality of urban life and achieving sustainability. Yet, little attention has been paid to how CES might practically be incorporated into urban planning. The paper addresses this gap by examining the challenges planners might face when handling CES, establishing strategies for addressing the challenges, and highlighting key factors planners should consider when planning for CES. CES differ greatly from other ecosystem services—they are definitionally vague, difficult to measure, often bundled with other services, and depend on users' perceptions and situational factors. Therefore, rather than adopting a deterministic approach to generating CES, we suggest that urban planners should seek to create opportunities for CES to "hatch" and "grow" as people encounter nature in cities. This paper draws from diverse theoretical considerations of the CES concept as well as greenspace planning scholarship and practice. We identify five factors that need to be considered when planning for CES: place, people, past, practices and purpose. We see the proposed '5P' framework as a useful heuristic for planners when implementing CES in urban planning.

Keywords: cultural ecosystem services; participatory governance; urban greenspace; urban nature; urban planning

Introduction

The fundamental goal of urban planning is liveability, that is, quality of urban life (Myers, 1988; Steinø, 2004). While for centuries that goal was pursued via technological measures, the rapid urbanisation and the accompanying change in lifestyle in 19th and 20th centuries started compromising environmental sustainability, causing a turn towards considerations of solutions based on nature. Realisation of humanity's impact on natural systems globally led to the genesis of the concept of ecosystem services (ES) (MEA, 2005). The definition of ES as "the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life" (Daily, 1997a, p. 3) suggests that the concept shares the common goal with urban planning, and indeed is increasingly integrated into it (Cortinovis & Geneletti, 2018; Hansen et al., 2015; Rall et al., 2015; Woodruff & BenDor, 2016). However, unlike provisioning, regulating and supporting ES, cultural ecosystem services (CES) have not yet been well translated to practice and little attention has been paid so far to how CES might practically be incorporated into urban planning (Campbell et al., 2016; La Rosa et al., 2016). Rare articles covering that topic address only specific aspects such as classifying and valuing of some CES (along other ES) (Canedoli et al., 2017; Gómez–Baggethun & Barton, 2013) and reviewing indicators of CES for urban planning (La Rosa et al., 2016; Tratalos et al., 2016). Plieninger et al. (2015) investigated the ways how CES can be incorporated into landscape management and planning. Our paper aims to focus on urban settings and identifying factors that urban planners need to account for when incorporating CES into comprehensive urban planning and management.

CES have lagged behind other types of ES in terms of both research and practice because their intertwinement with subjective human perception has led to epistemological challenges and has attracted various critique (B. Fisher et al., 2009; James, 2015; Kirchhoff, 2019). Moreover, the concept of Nature's Contributions to People (NCP), adopted by the Intergovernmental Platform on Biodiversity and Ecosystem Services, has drifted from earlier ES concepts partly due to conceptual and practical differences between CES and other ES (Díaz et al.,

2018). The NCP concept sees culture permeating "through and across all three broad NCP groups (…) rather than being confined to an isolated category" (Díaz et al., 2018). Irrespective of whether CES are considered as a category in themselves or culture is perceived as an overarching lens, there is a need to translate the cultural dimensions of human–nature relationships into practical urban planning and decision-making.

Due to its role in generating ES in cities, urban nature has been recognised as an important venue for studying and planning urban CES. Dickinson and Hobbs (2017, p. 188) stress the need for exploring the connection between CES and urban greenspace (UGS) in "unlocking myriad wellbeing benefits". Moreover, people seem to interact with nature in order to induce such benefits, which is why Andersson, Tengö, et al. (2015) proposed that CES can serve as a gateway for addressing and managing urban nature and consequently improving urban sustainability. However, the problem of rising alienation from nature (Pyle, 1993; Soga & Gaston, 2016) deprives people of various benefits provided by nature and may change their attitude towards nature (W. Zhang et al., 2014). Studies of human–nature relationships have hence become increasingly relevant for both research and practice at the intersection between CES and UGS.

Our argument is based on the assumption that CES are the main reason people interact with urban nature (Bertram & Rehdanz, 2015; Ko & Son, 2018). Modern cities are faced with various social and environmental problems such as social stratification, environmental pollution and loss of greenspace; interacting with nature for associated cultural benefits and meanings may provide viable solutions to these problems. The contributions of CES to social and health conditions of urbanites must not be overlooked (Chen et al., 2019; Jennings et al., 2016). It is imperative, therefore, for CES to be incorporated into urban planning in order to advance the quality of urban life and aim to achieve urban sustainability. Although few studies are directly concerned with translating CES into urban planning, existing research on planning for UGS and ES more generally may provide useful insights to help incorporate CES into urban planning.

In this paper, we aim to critically review knowledge of CES and combine it with urban planning principles to propose a conceptual tool for translating CES into urban planning. To maximise the direct applicability of these insights to current practice, we focus our attention on conventional governance cycles based on rational planning tradition that dominate in much of the world. We pursue our aim by examining the following research questions:

(1) *Challenges*: What should planners be aware of when handling CES?
(2) *Strategy*: What strategy could reconcile these challenges for successful planning for CES?
(3) *Foundational considerations*: What factors planners should take into account when planning for CES?

We believe that the trajectory of 'challenge > solution > elaboration' will work best with stakeholders and practitioners interested in CES in urban planning and encourage scholars to build further on our proposal.

Materials and methods

In order to define a plausible strategy for planning for CES, we firstly conducted a qualitative review of literature on the CES concept as well as ES concept where CES are explicitly considered. We aimed to identify characteristics of CES relevant for urban planning that may pose challenges for planners when accounting for CES. While acknowledging diverse approaches to cultural dimensions of human–nature relationships, and aware of criticism, we chose the CES concept as it has a broad set of theoretical and conceptual considerations, and is widely accepted by academics due to its affiliation with the broader ES concept. Furthermore, it already has a firm scientific connection with greenspace studies which we deem crucial for developing a framework that will incorporate cultural dimensions of human–nature relationships into urban planning.

The Web of Science (WoS, v.5.32) database was used to search the literature, complemented by a snowball method (Greenhalgh & Peacock, 2005), which enabled reaching more relevant papers. The database was searched on 22

April 2019 for exact terms "cultural ecosystem service*" and "cultural service*" in the title. The two searches focused on articles published between 1990 and 2019. The searches returned 231 papers. Further selection was carried out against the following criteria: (1) the paper addresses CES, (2) the paper is written in English, (3) the paper is either primary research or a review article (datasets were excluded), and (4) the paper does not address exclusively rural areas. The selection resulted in 90 papers which were subjected to further analysis. The excluded papers included 29 articles not addressing CES (but rather cultural services in non-ES-concept context), 108 articles addressing exclusively rural areas, three articles in other languages (Korean and Chinese) and one article that was returned twice. The snowball method, carried out while reviewing selected papers, added another nineteen papers to the analysis, which was performed on a final total of 109 papers, out of which 38 were theoretical and 71 empirical (see online supplementary data for the final list of articles).

Following the selection phase, papers were analysed qualitatively to identify challenges that CES pose before planning. Based on our practical planning experience and comprehension of CES we inductively classified the identified challenges into five groups based on their cause:

(1) challenges arising from definitions and classifications,

(2) challenges arising from people's involvement in CES generation,

(3) challenges arising from evaluation,

(4) challenges arising from ecological complexity, and

(5) challenges arising from diminishing contact with nature.

Besides papers on CES, several papers on urban planning, planning for ES and UGS have been reviewed to support the analysis of challenges (research question 1), develop a plausible strategy (research question 2) and explain relevant factors in planning (research question 3).

Challenges in planning for cultural ecosystem services

CES are difficult to define, classify and measure; this poses challenges in transferring the CES concept into urban planning. Given that the challenges arise primarily from the distinctiveness of CES in comparison to other ES, to understand them we need to scrutinise their character and analyse the CES concept in the planning context.

Challenges arising from definitions and classifications

In contrast to the other three types of ES, which can unequivocally be linked to ecological functions, CES seem more related to psychological and social processes. The Millennium Ecosystem Assessment (MEA, 2005) thereby defined CES as the "nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences". Further, it classified CES into nine non-encompassing sub-categories: cultural diversity, spiritual and religious values, knowledge systems, educational values, inspiration, aesthetic values, social relations, sense of place, cultural heritage values, and recreation and ecotourism. Various authors have attempted to refine the classification (Bryce et al., 2016; Hernández–Morcillo et al., 2013; Rall et al., 2017) and expand the suite (Gould & Lincoln, 2017).

The list of CES subcategories indeed does not seem conclusive nor systematic. In the review of 142 CES-related papers, Blicharska et al. (2017) discovered that there is no consistency in general definitions of CES and their naming. As Huu et al. (2018) remarked, in the broader ES suite CES are often treated as a broadly labelled, residual category after accounting for other utilitarian benefits. In other words, there is a practical problem of how to distinguish between the cultural ecosystem services and resulting cultural ecosystem benefits (CEB) for users—a division known as the ES cascade model (Haines–Young & Potschin, 2010). For instance, a cemetery (*ecological structure*) may be a spiritual place (*ecosystem service*) that supplies visitors with a feeling of "staying connected" with the dead (*benefit*), but at the same time also a historical

place (*ecosystem service*) providing visitors with experiences of a local funeral tradition and funerary architecture (*benefits*). All these benefits may make the cemetery important to people (*value*). This example shows the complex interconnections among ecological foundation, CES and resulting benefits and due to the unclear disambiguation between elements of the cascade, planners might mistakenly double-count spiritual place and the feeling of "staying connected" with the dead as two CES (Hernández–Morcillo et al., 2013), whereas only the former pertains to service and the latter is a benefit emerging from the service. Similarly, planners might double-count experiences of funeral tradition and funerary architecture as two CES, while both are actually benefits arising from the same service. Blicharska et al. (2017) documented numerous instances where different elements of the cascade were categorised as CES. Benefits can, indeed, be assessed as well as services, however for planning purposes it would be practical to assess them separately.

In an attempt to develop a framework for the research of CES, Fish, Church, and Winter (2016) subjected the CES concept to the cascade model and discerned biophysical domain (ecological structures and processes), cultural services (and goods), benefits and values. In their framework, CES are divided into *environmental spaces* and *cultural practices*, which in interaction generate benefits grouped into three categories: *identities*, *experiences* and *capabilities*. Already an initial linking of MEA's subcategories of CES with the proposed framework suggests that they are actually a mix of services, benefits and values.

It should be noted that most papers on CES build upon the MEA classification and therefore further arguments that we will analyse, do not necessarily pertain exclusively to the level of services but also the levels of benefits and values.

Challenges arising from people's involvement in CES generation

One of the critical dimensions of CES in the context of urban planning is the contribution of nature to physical and mental wellbeing, which corresponds to

Fish, Church, and Winter's (2016, p. 212) level of CEB: "the identities they help frame, the experiences they help enable and the capabilities they help equip". For all these benefits to be realised, human participation is indispensable, which is why researchers stress that CES are co-produced between humans and nature (Chan et al., 2011; Dickinson & Hobbs, 2017; Fischer & Eastwood, 2016; Fish, Church, & Winter, 2016). If CEB are generated through interaction between people and their environment, that implies that they are (1) *place-based*, which means they cannot be replicated exactly elsewhere because different places generate unique experiences for users (Dickinson & Hobbs, 2017; Johansson et al., 2019) and (2) *person-based*, meaning each person undertakes practices that are in line with values they cultivate, and treat benefits according to those values (Fish, Church, & Winter, 2016). Finally, both environment and people's behaviour are susceptible to timing; for instance, the same person may react differently to the same place in different moods or weather conditions. All this together suggests that *CEB generation is the product of a unique user in a specific place at a particular time*.

This imposes several challenges for planning. First, planners can plan environmental spaces and encourage particular behaviour, but they cannot significantly influence the human factor as described above. Therefore, they cannot plan exactly which CEB will be generated. Second, not all behaviours or environmental features would be perceived positively, and people can have conflicting responses to the same features/behaviours. For example, the sound of some birds may be perceived as unpleasant (Belaire et al., 2015); dog-walking can be regarded as both positive and negative (Fischer & Eastwood, 2016). Moreover, a person may perceive features differently from moment to moment depending on their mood or time of the day (e.g. a lovely park in daylight might seem scary during the night). The planning process should, therefore, account for the potential generation of negative perceptions and experiences which are known as *disservices* (Lyytimäki & Sipilä, 2009).

The third challenge is that *once degraded CES are unlikely to be replaced by technical or other means* (MEA, 2005). For instance, if we replace a meandering

river with straightened one flanked by levees, the ecosystem benefit in the form of protection from flooding might improve. However, people who used to play with dogs along the meandering river would likely perceive its new form differently and change their habits accordingly. Consequently, the generated CEB would likely not match those that were generated before. Similarly, no substitute place can generate the same CEB. Finally, in contrast to many other services, CEB can be perceived directly and experienced locally, irrespective of their ecological knowledge or the availability of measuring equipment (Andersson, Tengö, et al., 2015; Daniel et al., 2012). For instance, direct perception of carbon sequestration or air quality regulation requires an advanced understanding of ecological processes like photosynthesis, gas exchanges at leaf surface and how they affect human wellbeing; in contrast, appreciation of beautiful scenery or recreation in a park do not require ecological knowledge (Andersson, Tengö, et al., 2015).

Challenges arising from CES' evaluation

Among the most prominent challenges in including CES into planning has been their insusceptibility to quantification, commensurability and monetary valuation (Chan, Satterfield, et al., 2012; Satz et al., 2013; Stålhammar & Pedersen, 2017; Tengberg et al., 2012). La Rosa et al. (2016) identified three features of CES that differentiate their evaluation from other ES. The first one originates from the lack of conceptual clarity required for measurement which we addressed in 'Challenges arising from definitions and classifications' section. Consequently, studies have so far concentrated on assessing or mapping benefits rather than services themselves (Blicharska et al., 2017; La Rosa et al., 2016). From a planning perspective, it is essential to consider both service and benefits levels as CES generate CEB, which makes CES subject to planning, while CEB is why people interact with urban nature in first place and as such present the outputs of CES.

Second, people intentionally interact with nature to generate CEB. Which CEB they want to generate may be influenced by previous experiences, particular values they hold and the attitudes and meanings they attach to the place. This

implies that CES show greater variability and subjectivity than other services (La Rosa et al., 2016). As such, pre-planning assessment and post-planning monitoring of CES require different methods to those needed to assess other ES. Finally, it is challenging to spatialise CES when they depend on perception (La Rosa et al., 2016). There might be cases where human–nature interaction may take place outside of the ecosystem and still generate CEB. For instance, a person may recall positive memories of time spent in a park, or experience them virtually, in which case some CEB may be elicited by but not generated within the park. The generation process still requires an ecosystem and human activity, but the interaction needs not be physical. This is still an area that requires further exploration, including its importance for urban planning. The difficulty in spatialising CES hindered the application of the *service providing unit* (SPU) concept to CES, notwithstanding its increasing application when addressing other ES. The SPU concept was introduced by Luck et al. (2003) and defines a physical unit at which certain ES is generated (Calderón–Contreras & Quiroz–Rosas, 2017).

In our analysis, almost a fifth of all studies attempted to develop and apply mapping and assessment methods. Nevertheless, most studies addressed only those CES which are relatively easy to spatialise and measure, such as recreation and tourism (Chan, Guerry, et al., 2012; Martin et al., 2018; Milcu et al., 2013) although there is an increasing trend to use social media for reporting and evaluation of various CES (e.g. Do, 2019; Figueroa–Alfaro & Tang, 2017). Furthermore, most studies that aimed to evaluate CES have not been used to actually support decision-making, due to which there is a gap in the literature regarding application of evaluation techniques in practice (Canedoli et al., 2017). Despite some isolated examples (Coscieme, 2015; Hutcheson et al., 2018), the framework for assessing other CES, or desirably the comprehensive framework for assessing all CES, is yet to be designed and transferred to the planning practice. Nonetheless, Pröbstl–Haider (2015) calls for transcending methodological discussion on measurement of CES and focusing on expected

outcomes of CES-related decisions, like health and wellbeing improvement, and evaluating such decisions.

Challenges arising from ecological complexity

A vital issue for planning is how ES generation relates to the complexity of ecological structures and processes. Sometimes more than one ecological structure or process is needed to produce a single service (Z. G. Davies et al., 2011), but also one structure or process can generate multiple services (Pauleit et al., 2011). Understanding how CES bundle with other ES (Raudsepp–Hearne et al., 2010) is of high relevance for planning. For instance, parks as environmental spaces and related cultural practices, like recreation or enjoying scenery, are supplemented by other ES such as air regulation, noise inhibition and carbon sequestration. CES are bundled with other services more often than other ES (Cooper et al., 2016; Klain et al., 2014; Reyes–García et al., 2015). Moreover, CEB are often generated as by-products during the utilisation of other ES (Díaz et al., 2018; Urquhart & Acott, 2014). Planning and management of CES should, therefore, consider how approaching them in bundles might lead to improved outcomes for ES overall (La Rosa et al., 2016). Relatedly, some interactions with nature may result in benefits which are not exclusively cultural (Blicharska et al., 2017). For example, fishing may provide food (provisioning service) for some, for others it may be a recreational activity (CES), but for many people it may be both (Chan, Satterfield, et al., 2012).

Challenges arising from diminishing contact with nature

Several authors argue that modern urban life diminishes contact with nature. This problem, also referred as alienation from nature (Pyle, 1993) and extinction of experience (Pyle, 1993; Soga & Gaston, 2016), deprives people from often irreplaceable contributions to their medical, psychological, and social wellbeing as well as opportunities for unique and fulfilling experience (Bixler et al., 2002; Daniel et al., 2012). The ES concept understands these contributions as

CEB, which means that with diminishing contact comes a reduction in CEB. Additionally, this may lead to reduced people's awareness of nature and subsequently care for its protection and willingness to practice pro-environmental behaviour (Collado et al., 2013; Pyle, 1993; Soga & Gaston, 2016), consequently distancing us from achieving urban sustainability. Some have suggested a positive feedback loop where reduced awareness of nature further decreases desire for contact with nature (Soga & Gaston, 2016). The positive feedback loop can also be reversed—increased contact with nature leads to enhanced awareness of nature and pro-environmental behaviour (Ives et al., 2018). The study by McGinlay et al. (2018) suggests that a sense of nature-connectedness may enhance the generation of CEB, which in turn are more influential in motivating pro-environmental behaviour compared to other types of ES, albeit also more marginalised in policy and planning (Hirons et al., 2016). Similarly, in their study of the human–nature relationship in two Scandinavian cities, Beery et al. (2017) found that CEB generated during incidental contact with nature may stimulate intentional contacts and consequently disrupt the trend of diminishing contact with nature.

Conceiving a strategy for addressing observed challenges

A framework for including CES in urban planning cannot be built upon the natural-science paradigm that underpins other ES and emphasises independence and objectivity (Raymond, Frantzeskaki, et al., 2017; Tengberg et al., 2012) as CES generation depends on human participation, and this is the decisive factor in planning for CES. There are myriad CEB that may be generated, perceived and received differently depending on factors such as the individual or groups' reasons for being at the location, previous experiences, expectations and existing values, or health and mobility. Thus, even if planners attempt to organise an ecosystem to generate specific CEB, the outcome of the generation process may not match the planned benefits.

Building on identified challenges, we designed a framework for planning for urban CES that proposes solutions to each of them (Fig. 2.1). As a general principle we suggest that planners focus on *providing opportunities for CES to "hatch" and "grow"* as people encounter nature in cities. Instead of planning elements of the ecosystem that would stimulate particular CES, this proposed strategy would mean planning ecosystems to enable opportunities for people to interact with urban nature, co-produce diverse CES and derive most diverse benefits.

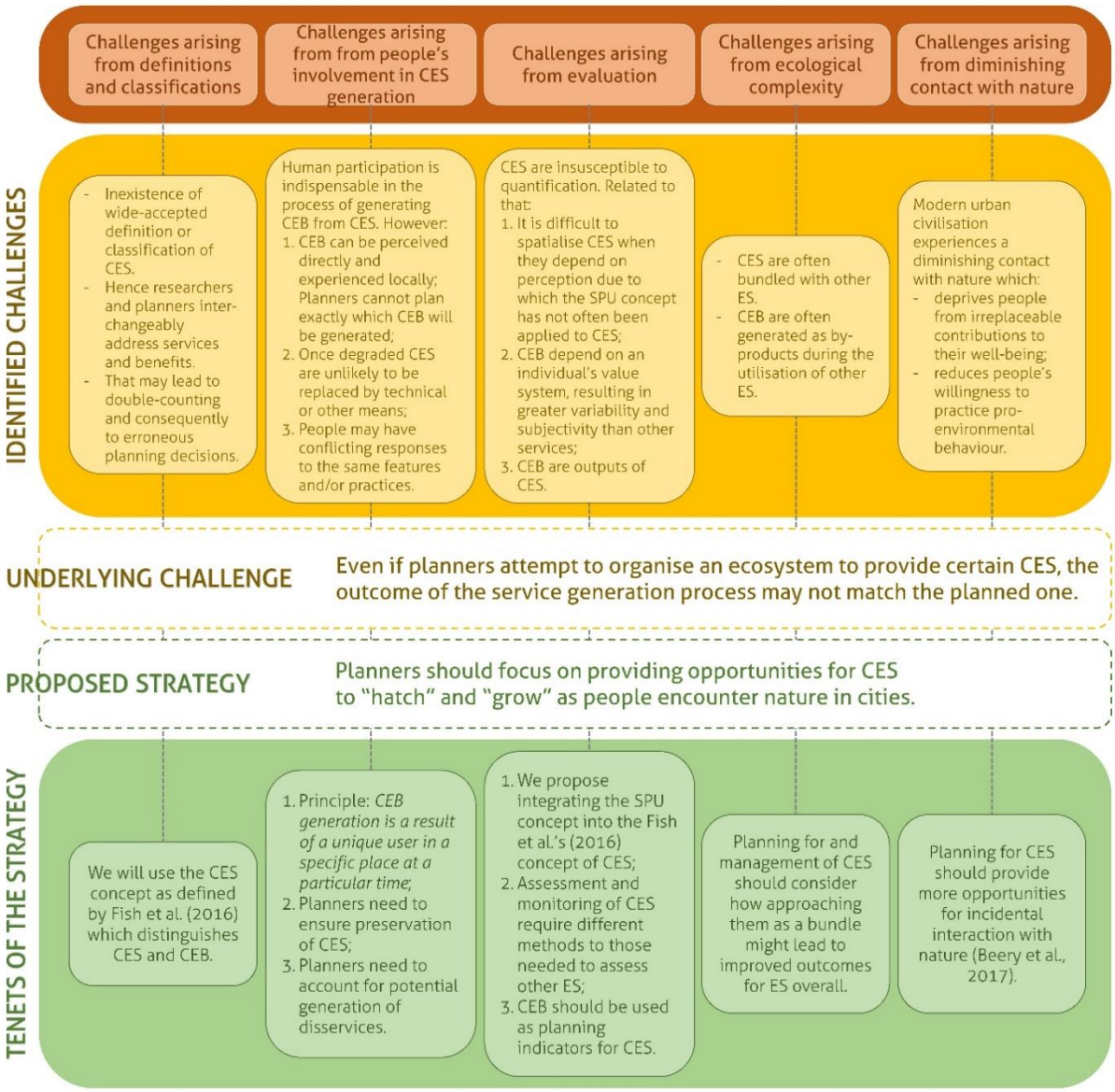

Fig. 2.1. Overview of identified challenges and proposed solutions for incorporation in urban planning.

Foundations of the proposed strategy

Here we outline a strategy for making the CES concept more relevant for urban planning, based upon addressing the three most pressing challenges identified in the previous section:

(1) clear disambiguation between CES and CEB;
(2) spatial dimension of the CES concept; and
(3) reversal of the trend of diminishing contact with nature as a contribution to achieving urban sustainability.

Considering these challenges and based on the literature review, the proposed strategy combines the framework by Fish, Church, and Winter (2016), which systematically disambiguates CES and CEB, with the concept of SPU (Andersson, McPhearson, et al., 2015; Luck et al., 2003) and Beery et al.'s (2017) Incidental Nature Experience Cycle model.

Fish, Church, and Winter's (2016) framework (Fig. 2.2) distinguishes environmental spaces and cultural practices as mutually reinforcing CES. Environmental spaces provide a spatial context for cultural practices which represent expressive, symbolic and interpretive interactions between people and nature. Environmental spaces enable and inspire cultural practices which in turn shape these spaces. Practices are shaped by cultural values, but they may also shape those values through contributions of human–nature interactions to human wellbeing, i.e. CEB (Fish, Church, & Winter, 2016). CEB are further classified into experiences that are generated in discrete encounters with urban nature, capabilities that are generally enhanced through recurrent encounters with urban nature, and identities that represent symbolic associations with specific urban natural places.

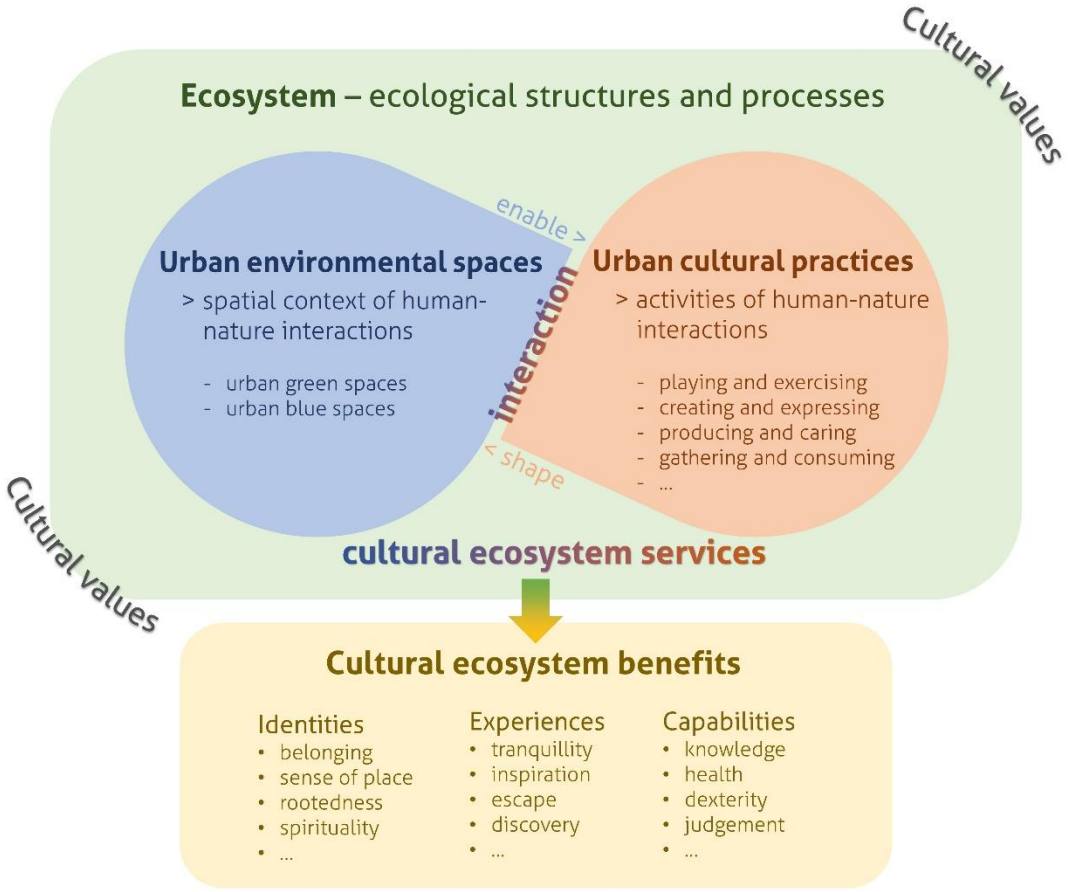

Fig. 2.2. Concept of cultural ecosystem services and benefits, adapted from Fish, Church, and Winter (2016).

The disambiguation between different elements of the CES cascade is valuable in bringing the scientific concept of CES closer to practice. Systematic division and classification between CES and CEB can help decision-makers and practitioners more effectively to understand, detect, plan for and manage cultural services and benefits (Blicharska et al., 2017; Fish, Church, & Winter, 2016; Potschin–Young et al., 2018). By means of environmental spaces, CES can be more firmly spatialised, which greatly facilitates their planning. Since cultural practices always take place in environmental spaces (or are connected to them in mind), it follows that environmental space corresponds to SPU. This enables planners to link detected/mapped cultural practices and CEB to specific places.

CES can have a pivotal role in achieving urban sustainability by integrating benefits from urban nature in urban planning and management (Andersson, Tengö, et al., 2015; Chan & Satterfield, 2016) and reversing the trend of diminishing contact with nature (Hirons et al., 2016). Andersson, Tengö, et al. (2015) argue that CES are meaningful to people because they are comprehensible and recognisable in interactions with nature. However, documented alienation from nature (Pyle, 1993; Soga & Gaston, 2016) seems to distance us from sustainability goals. We see Beery et al.'s (2017) Incidental Nature Experience Cycle model useful in combating that trend. The model suggests that exposure to the incidental experience of nature (e.g. green reflections in temporary rainwater puddles or seeing an otter in the river) during daily activities may stimulate intentional experiences. The actual stimuli there are the CEB linked to incidental experiences such as emotions evoked when seeing an aesthetically appealing natural phenomenon or a wild animal in a greenspace. Besides the direct effect of incidental experiences leading to subsequent repeated intentional experiences, they also show that social media records of incidental experience may stimulate other people's intentional experience. Beery et al. (2017) hence propose that if arranged to involve transitory visits to greenspace, daily urban activity (such as mobility for work, school, or supply) may provide both intentional and incidental opportunities for interaction with nature.

Our strategy follows the principle that CEB generation is a result of a unique user in a specific place at a particular time. Hence, exactly which CEB will be generated depends on a combination of human and situational factors at a given time. In practice, that means designing and distributing diverse environmental spaces across cities in order to make them easily accessible and attractive for users. That way, both intentional and incidental interactions with nature are enabled and encouraged, allowing for generation of diverse CEB, hence contributing to the quality of urban life (Andersson, Tengö, et al., 2015; Raymond, Frantzeskaki, et al., 2017). While we advocate that primary planning goals should be designing multifunctional and internally diverse environmental spaces, Niemelä et al. (2010) imply that even small UGS can be sufficient for interaction

with nature while Ko and Son (2018) show that even everyday surrounding, such as street trees, can suffice for eliciting CEB. That said, it is important that planners also anticipate potential disservices which may discourage people from interacting with particular environmental spaces or hinder the generation of CEB (see section *Place*).

Finally, we round up the strategy with a so-called 5P framework by which we outline a set of five key factors that influence the CES generation process: place, people, past, practices, and purpose. These factors are often interwoven and firm boundaries among them cannot be drawn (Fig. 2.3-a). For example, the place factor corresponds to biophysical settings of an environmental space. These settings influence the possible purpose of the space as well as what practices users will perform in it. But the biophysical settings may also be (re)shaped by purposes given to that environmental space and practices that people perform there over time.

We could imagine CES generation process, in a simplified manner, as a function of factors where different combinations of factors generate different conditions for human–nature interactions, and subsequently different CEB may be generated. But individual factors are not unidimensional; they are an umbrella for a number of specific modifiers. For example, place factor is not a single determinant of the CES generation process but rather a set of several different modifiers (e.g. size, landscape diversity, etc.) that each influence the human–nature interaction; modifiers are thematically subsumed under place factor. In that sense, not only different combinations of factors would influence what CEB will be generated but also different combinations of modifiers within each factor.

The 5P framework encourages planners to carefully consider these multifaceted factors when planning for CES as they determine its success and the planning outcomes. While we outline each of the factors within our 5P framework below, we stress that each combination of environmental space and cultural practices is unique and no universal list of modifiers can be given that would be applicable in every planning situation. Moreover, we do not see the 5P framework as a comprehensive list of all relevant factors that need to be accounted for in

planning for CES, but rather as a set of five key factors that should not be omitted in urban governance, especially assessment, planning and management phases. The factors are primarily relevant for planning individual SPUs; however, to ensure diversity of opportunities for CES generation across urban space, some aspects might be of relevance when developing city- or neighbourhood-wide urban plans.

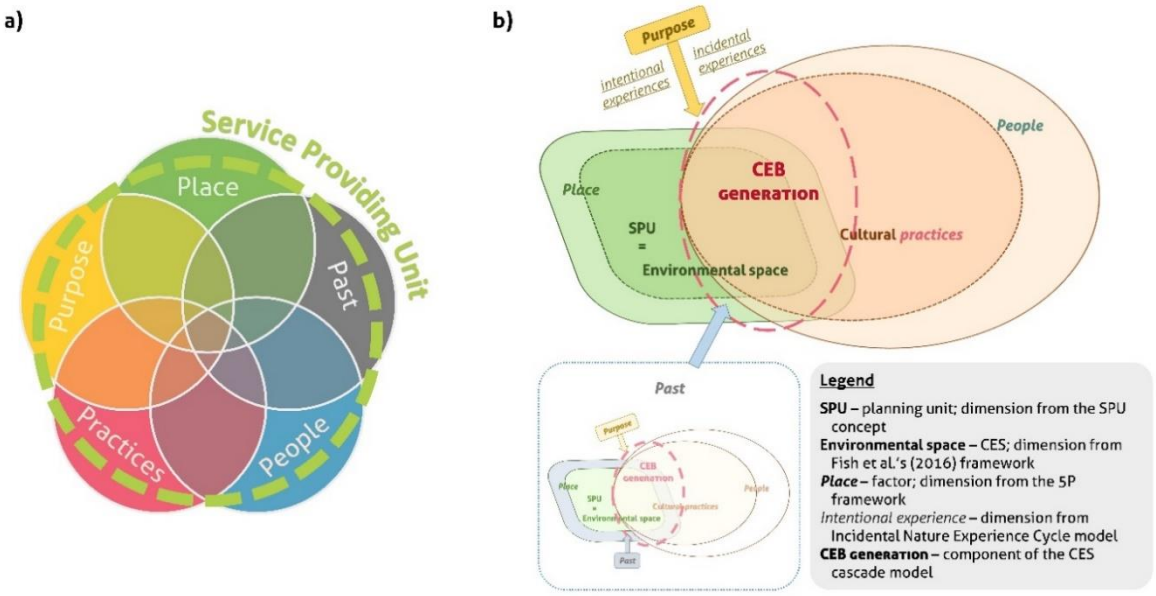

Fig. 2.3. The proposed strategy for incorporating CES into urban planning: a) the 5P framework, and b) the 'hatch' and 'grow' strategy.

Fig. 2.3-b shows the schematic representation of all the components discussed above integrated into the "hatch" and "grow" strategy. CEB generation process takes place at the interface between cultural practices and environmental spaces (which corresponds to an SPU). This process is directly or indirectly influenced by the 5P factors which represent the main venues for urban planners to influence the generation of CEB. Note that strategy addresses the influence of factors within an SPU, but the factors themselves are not bounded within SPU. For instance, the surrounding of a park may influence how users will perceive it, and someone may generate CEB in their house when remembering a time spent in the park.

Incorporating the proposed strategy into the spatial governance of cities

We argue that the proposed strategy should be incorporated into the spatial governance of cities. While recognising diversity of urban governance systems (Grisel & van den Waart, 2011; Tosics, 2011), to demonstrate this we use a conventional governance system based on rational urban planning. This is still in place across much of Europe (Tosics, 2011) and often serves as a foundation for the introduction of alternative approaches from multi-level governance and planning (Daniell & Kay, 2017; Faludi, 2012; Giaimo et al., 2019; Stephenson, 2013; Tillemann et al., 2015), incremental planning (Lindblom, 1959), and democratic approaches like transactive planning (Friedmann, 1973) and planning based on critical communication theory (Forester, 1980).

The rational spatial governance process involves five main components: assessment, planning, decision-making, implementation and management (Fig. 2.4). These are discussed in turn below. While we present components sequentially here, in practice this is an iterative, circular process and it may be necessary to move fluidly among the stages to ensure appropriate outcomes. In accordance with principles espoused by proponents of multi-level governance and public participation (Daniell & Kay, 2017; Fischler, 2012; Taralunga, 2010) we uphold active participation of all interested parties in all segments of governance (and planning) processes. That includes city authorities, citizens, civil organisations, private sector, public institutions and other levels of government (i.e. local, regional, national, supranational).

The first stage is for planners and decision-makers to assess the state of CES provision by obtaining quantitative and qualitative data about ecosystems and how people use and appreciate them. Fish, Church, and Winter's (2016) framework can effectively facilitate the assessment of both CES and CEB at SPUs of interest. It is important that planners acknowledge the subjectivity of CES and use different methods for their evaluation than for other ES (La Rosa et al., 2016). The lack of quantitative data is often mentioned as a problem in applying ES and CES concept in practice, however planning often does not necessitate very

detailed data but rather robust information to inform decision-making (Albert et al., 2014). Moreover, Fish, Church, and Winter's (2016) framework helps with quantitative treatment of CES as it discerns spaces and practices and classifies CEB. Furthermore, in contrast to most other ecosystem benefits, people can directly perceive and experience CEB (Andersson, Tengö, et al., 2015), which implies that they could, therefore, serve as indicators of CES. Examples of the use of reported CEB in assessing CES can be found in Church et al. (2014), Fish, Church, Willis, et al. (2016) and Bryce et al (2016).

Second, collected data serve as input for the planning process, enabling planners (preferably via a participatory process involving all interested stakeholders) to come up with co-produced variant solutions and present them to decision-makers and/or stakeholders (depending on the decision-making system). Importantly, we see the planning process as a fruitful discussion in which stakeholders propose ideas and defend their individual and group interests while planners bring ideas and expertise, abiding by professional principles and encouraging innovation. SPUs should be planned and designed to increase opportunities for diverse encounters between people and nature, thereby advancing urban nature's contributions to the wellbeing of urban dwellers. These should entail both incidental and intentional opportunities. In proposing solutions for existing SPUs, planners should account for irreplaceability of CES as the lost CEB could not be substituted by technical or any other means (MEA, 2005). Planners should treat urban nature as multifunctional ecosystems, managing them as bundles of various ES, with CES being most easily recognisable and appreciated among stakeholders (see section *Purpose*).

Third, decision-makers and/or stakeholders can choose which of the proposed solutions will be implemented. The implementation phase usually begins after decisions are made and may last until the completion of the next planning phase, depending on the number and timing of changes that need to be introduced to SPUs. It may include short incubation periods after implementation when both the ecosystem and its users adapt to changes. This is the period during which new meanings of the place and attitudes towards it may be formed. The

management phase continues in parallel with all other phases and ensures the ecosystem functioning according to the maintenance and use regime in effect. A vital component of management is monitoring, which role is to monitor the ecosystem functioning, use and maintenance. Effective monitoring should inform timely the decision-makers about the state of SPUs and possible issues, so they are able to respond and fix them. Moreover, adequate monitoring should provide constant dynamic information about the state of SPUs, which will provide evidence for assessment. Again, CEB might effectively serve as monitoring indicators of CES and the state of the ecosystem as people perceive them directly (see section *Purpose*).

Fig. 2.4. Spatial governance cycle for SPU. The process begins with assessment and finishes with implementation phase, followed by a new cycle of plans and implementation. Theoretically, the management phase continues without interruptions, although it is amended by new instructions stemming from the planning process at the beginning of every implementation phase. Note that the length of phases in schematics does not approximate the duration of phases in the real process.

Key factors planners should consider when planning for cultural ecosystem services

Following the settings of the proposed strategy and based on the characteristics of CES and challenges identified, here we elaborate on each factor of the 5P framework.

Place

Place factor entails biophysical setting of an SPU planned area. In Fish, Church, and Winter's (2016) framework, place corresponds with environmental spaces which in urban context entail urban green and blue spaces (UGBS) as primary instances of urban nature. As such, the place factor enables identification of locational potentials and limits. There is a longstanding tradition of planning for greenspace provision in virtually every city in the world (e.g. Maruani & Amit–Cohen, 2007; Slukan Altić, 2012), so we consider both research and practice of greenspace planning a useful starting point for developing the framework for planning for CES which could aid the development of grounded guidelines for planners. *Urban greenspace* can range from remnants of semi-natural vegetation through private gardens to managed public parks and playgrounds (Dickinson & Hobbs, 2017). In the practical sense, UGS planning overlaps considerably with planning for CES and should be used as a venue for incorporating CES into urban planning.

Consideration of place should occur in planning at various scales. When planning particular environmental spaces planners need to account for its landscape-ecological character, management regime, and surroundings. All three of these define the character of a place and outline its locational potentials and limits. Creating opportunities for CES to "hatch" and "grow", that is enlarging the variety of CEB that people may generate by incidental and intentional interactions with urban nature, requires diversity and structural complexity of SPUs. In other words, where possible, an SPU should be diverse biologically, geologically and in terms of landscape design. The study by Jaligot et al. (2019)

showed that elements like woods, lakes, parks and paths are critical factors for eliciting CES to a varying extent. The appropriate structural (and infrastructural) arrangement of UGBS may increase the users' satisfaction with them and generation of CEB (Zwierzchowska et al., 2018). On the other hand, varying degree of management in different parks may provide diverse ecological conditions (in terms of animals and plants) and thereby diverse opportunities for incidental interaction and eliciting CEB (Langemeyer et al., 2015; Poniży et al., 2017). In addition, a park will have quite a different character depending on whether quiet family houses or busy roads surround it, although the impact of unfavourable surroundings can be mitigated by shrubs and trees that serve as buffer (Hansen et al., 2015).

On a larger scale, it is essential to ensure that SPUs vary across the city area providing different opportunities to their visitors. Since cities are functionally connected to their surroundings, Xiao et al. (2017) propose addressing urban CES over the scale as large as urban agglomeration. The ecological character of circular zones around city centre usually determines the type of environmental spaces that are available for interaction with nature. Rall et al. (2017) found that the inner city does not necessarily provide less CES than suburban zones; on the contrary, it can be a hotspot of CES, only different ones to those in suburban area. There is a need to assess preferences along the urban–rural gradient in urban agglomerations to inform planning for CES as residents of different zones might prefer different environmental spaces (Zhou et al., 2018). The participatory process can prove helpful in evaluating diverse design proposals and their outputs in terms of opportunities for CES generation (Møller et al., 2019). Moreover, studies are demonstrating the potential and usefulness of participation in planning UGS at different scales when focusing on benefits (Careva et al., 2018; Dennis & James, 2016). Users' involvement can be important in reconstruction plans given the CES' trait of irreplaceability (Andersson, Tengö, et al., 2015), because the future use of changed environmental spaces and consequently generation of CEB may be greatly affected by the design that users do not concur with.

When designing a UGBS, planners should be aware of possible *disservices* and *disbenefits* that can be generated due to the location character or certain structural elements. Weighing place-related factors (such as the location of elements and buffering of surrounding processes) could influence the occurrence and intensity of disservices and disbenefits generation. Fischer and Eastwood (2016) identified four types of cultural disservices and disbenefits which planners should be aware of and account for:

(1) forgone benefits, i.e., missed opportunities for the generation of CEB (e.g. absence of ducks in a pond);

(2) ecosystem structures that usually provide services yielding disservices (e.g. too many paths in a park or too many animals of particular species);

(3) ecosystem structures that produce ES and cultural disservices simultaneously (e.g. plantation forest can produce both timber and unpleasant views);

(4) ambivalently perceived services (e.g. use of a public park for dog walking may be perceived as a service by some and disservice by other people; we recognise that this is not necessarily related to the place factor).

Planners should take care of certain ecosystem structures that may provide both services and disservices. For instance, parks may attract birds and the opportunity to see them is often perceived as a service; however, if crows spread litter from bins in a park, that is often remarked as a disservice (see Cox et al., 2018). Citizens' involvement in deliberative decision-making might prove a successful strategy for addressing disservices and disbenefits at the local level, especially those related to activities that are perceived ambivalently.

People

While UGBS are indispensable for CEB generation, CEB are co-created by people. This is, therefore, the most demanding factor to consider as a variety of users, and their needs have to be accommodated. Urban planning should identify

the (prospective) users of planned UGBS and assess relevant demographic characteristics as well as people's habits, wishes and needs. This should help to reveal the demographic potentials and limits that need to be accounted for if the use of UGBS and the generation of CEB is to be maximised. It is essential to consider how people generate and utilise CEB. As argued earlier, CEB are generated through contact with nature where individuals' experiences, values and viewpoints shape the resulting benefits (Chan et al., 2011; Fish, Church, & Winter, 2016). While that implies that every individual will receive "self-tailored" benefits, it does not mean that the generation process is exclusively individual. Some CEB can be generated in individual contacts with nature while others may require a group of friends or pets or a group activity such as sport (Church et al., 2014). That means that in creating solutions, planning for CES must not neglect individuals and groups' preferences at the expense of the community as a whole. Riechers et al. (2018) found out that different age groups may show differing preferences towards environmental spaces and cultural practices. Planners, therefore, need to pay special attention to demographic variance to provide diverse opportunities for CEB generation that will benefit as many people as possible.

The use of UGBS and utilisation of CEB are strongly influenced by the demographic characteristics of users and many personal factors (preferences, wishes, needs, etc.) which need to be accounted in planning for CES (Dickinson & Hobbs, 2017; Riechers et al., 2018). Such information should be surveyed and given appropriate weight. However, even if planners try to assess citizens' preferences, they cannot assess their whole perception and value systems, and consequently, the outcome might still be inconsistent with users' desires (Riechers et al., 2017). For that reason, we argue that users should be actively involved in the decision-making, planning and management of CES (cf. Spyra et al., 2019). Since CES can be perceived directly and experienced locally, people are likely to be willing to participate in planning for CES (Cooper et al., 2016; Klain et al., 2014). Hernández–Morcillo et al. (2013) noticed that a participatory assessment of CES usually resulted in more successful outreach than non-

participatory assessment. We thereby believe that users' active participation in planning would have a similar effect. Such an opportunity would enable them to influence, amend and propose solutions that will be implemented.

Users can be involved in several ways. The conventional forms are surveys, interviews, public meetings, and focus groups, but these usually allow low involvement in the decision-making. Research on ES planning increasingly utilises 'public participation geographic information system' (PPGIS), which is often more participatory than meetings, more spatially nuanced than public surveys and more quantitative than focus groups (Ives, Oke, et al., 2017). Several studies have shown the benefits of using PPGIS in assessing and planning for CES (G. Brown et al., 2016; Canedoli et al., 2017; Møller et al., 2019; Rall et al., 2017). Another approach is citizen science that encourages people to become more involved in applied research, planning and management of urban nature in their community (Ahern et al., 2014). By using their knowledge of parks, citizens can recognise subtle changes and report them to managers. Such involvement creates more engaged, knowledgeable and ecologically literate CES users (Ahern et al., 2014) which can make a precious contribution to CES planning and management. Moreover, frequent UGBS users can supply valuable monitoring data. Every method has its advantages and disadvantages, its advocates and opponents. Combining approaches may increase the CES users' influence on the planning outcomes, but as facilitators of participation planners need to carefully select appropriate approaches and adapt them to the local context (Spyra et al., 2019).

Albert et al. (2014) warn of challenges that participation poses before planning for ES in general, such as the time that can be allocated to participation, limited experience and resources for facilitating participation, and integration of different knowledge types. Furthermore, Riechers et al. (2016) found out that in Berlin experts saw nature in more practical and management-centred way, whereas laypeople seemed to prioritise enjoyment of nature, which may induce conflict between them. Moreover, UGBS users are not a homogenous group, and there may be some interest groups within. Spyra et al. (2019) warn of the "My ES"

phenomenon where one or few services may be overemphasized because of particular interests of influential planning actors.

Past

There are always layers of past uses and activities which help define the character of a place (Edwards et al., 2016). In some places historical use may be the defining factor of their character without having a broader significance, elsewhere there might be elements of natural or cultural heritage that not only need to be considered but also preserved in a physical form. If people are aware of the history of a UGBS, it might affect how they use the site and what CEB are generated (Church et al., 2014). People often have long histories of association with particular UGBS, specific memories and feelings, which give it special meaning (Urquhart & Acott, 2014). This notion is connected with the research field of sense of place and place attachment (G. Brown & Raymond, 2007; Hausmann et al., 2016). Fish, Church, and Winter (2016) argue that an environmental space becomes a CES through unique place meanings created by myriad personal and/or social interactions with it. While historical uses and meanings in the landscape cannot be planned, they should be accounted for when planning for CES (G. Brown et al., 2015).

Planners can work with the past by incorporating it in opportunities for CEB generation. If a new function of a place is planned, it should involve traditions of the historical use of the place as this might elicit benefits like sense of place, belonging or local identity (Urquhart & Acott, 2014). If historical use and contents are carefully combined with the new function of the site, the opportunities created may help produce many CEB. In some instances of urban development, past ecosystems cannot be returned to its original ecological status (e.g. drying of an urban marsh to create conditions for construction in its surrounding). Such past ecosystems can be converted into UGBS that partly resemble the previous ecological status, but if adequately planned may provide opportunities for

generation of CES (and other ES) that were minimal or perhaps even absent from its original form (Collier, 2014).

Apart from history and past experiences, people also perceive and engage with nature differently depending on the age of a place. When a UGBS is created or reconstructed, users will need some time to adapt to it, that is, to form or renew their connection with it. Moreover, the natural development of UGBS (the change in its structure) changes the relationship between users and ecosystems. For instance, an old park with tall, ancient trees will provide opportunities for the generation of different CEB in comparison to an entirely new park with only young trees (Elliott et al., 2011).

Practices

According to Fish, Church, and Winter's (2016) concept, cultural practices represent CES along with the environmental spaces, but besides being a medium for interaction with nature, they are also a factor of CEB generation process. Practices are influenced by users' previous experiences, current mood and needs and other personal factors (cf. Raymond, Giusti, et al., 2017). They can be sporadic like walking or laying on the grass, and regular like gardening or dog-walking. Investigating existing practices, exploring the possible ones and surveying relevant public needs and wishes may provide planners with plenty of insights for designing UGBS and creating opportunities for CEB generation. Moreover, in many cases, collaboration with users may result in enhancing the CES output of existing practices as well as using them as a "track" for introducing new ones that would unlock new opportunities (Heikkinen et al., 2019; Nikolaidou et al., 2016).

Practices vary depending on the investment of energy and time (cf. enjoying the park from a bench and running). Urban (community and allotment) gardens are fine example of voluntary practice requiring substantial investment of energy and time (Bendt et al., 2013; Buijs et al., 2016; Colding et al., 2013). Although technically the product of the latter is fruits and vegetables, the more important outputs are likely to be social cohesion, place-making, nature experience, stress

reduction, exercise, etc. (Bendt et al., 2013; Camps–Calvet et al., 2016; van den Berg et al., 2010). These studies show that social-cultural benefits often outnumber provisioning services, implying that CEB are the underlying reason for gardening with food as a useful by-product. Moreover, the example of community gardens developed on vacant or abandoned land plots to create opportunities for CES (Andersson et al., 2014; Dennis & James, 2017) as well as initiatives focused on reintroductions of native species, removal of invasive species, or tree planting (Andersson et al., 2014; Daniel et al., 2012; Plieninger et al., 2015; Rall et al., 2015) imply that the community interest in urban nature is an important lever for the planning and management of CES. These studies suggest that people are willing to invest their energy and time in engagement with nature to generate CEB.

Planners should use this "capital" to strengthen the public–civil partnership in urban planning and management and jointly produce opportunities for CEB generation in the community area. The instances indicated above may be subsumed under the environmental stewardship concept, which involves the willing and active engagement of citizens in the processes of planning, decision-making and management of local UGBS (Bennett et al., 2018). Environmental stewardship benefits the whole local community (Ives et al., 2014; Krasny & Tidball, 2012; Plieninger et al., 2015) as well as individuals, i.e. stewards (Krasny & Tidball, 2012). It also reduces the risk of severe degradation of UGBS as stewards provide constant monitoring. Moreover, by utilising smartphone technologies, planners and managers may ensure a valuable and constant input of rich environmental data from UGBS users (Guerrero et al., 2016). Such stewardship increases the environmental, institutional and social resilience of the whole city (Buijs et al., 2016). Beery et al. (2017) showed that the use of smartphone technologies and social media in experiences with nature could stimulate further encounters with nature. More opportunities to interact with nature may also foster the sense of connection with nature and thereby reinforce the will and desire to engage with nature (Katz–Gerro & Orenstein, 2015; Soga &

Gaston, 2016; Winthrop, 2014), which is needed to leverage the societal change for sustainability (Ives et al., 2018).

Planners must also be aware of the challenges that accompany environmental stewardship. The most prominent is the probable lack of knowledge for comprehensive UGBS planning and management among UGBS users (Ambrose–Oji et al., 2017). Functional governance and maintenance of UGBS necessitate the active involvement of local authorities and professionals, who will ensure that UGBS are appropriately distributed, planned and managed, satisfying the needs of the urban population. Moreover, some training for stewards might need to be provided. The initiation of local environmental stewardship will often require a "push" from an external agency to come to life. Local authorities and non-governmental organisations can play an important role in instigating active citizenship (Buijs et al., 2016). These initiatives often start as public–civil programmes which may evolve or grow into a robust public endeavour (Rall et al., 2015).

Purpose

In highly utilised landscapes such as cities, every location has its purpose that determines its function and uses in urban system. With a plethora of actors involved, the role of urban planning is to manage competing interests to ensure optimal functioning of an urban system and satisfaction of various needs of its population (Pegan, 2007). That means that production of CES will be competing with other important functions and land uses (such as residential, commercial, industrial, etc.) in planning. Nevertheless, CES have an essential advantage in the form of ES bundling, which means that UGBS may accommodate various functions and generate multiple benefits at the same location (Cooper et al., 2016). We have already argued that planners should approach CES as part of ES bundles. Planning multifunctional UGBS that can generate a plethora of ES appears to be a desirable necessity in urban context (Pauleit et al., 2011). The degree of multifunctionality would depend on the *place* factor (locational

possibilities) as well as the broader ecological situation at various scales: from neighbourhood to districts to city to agglomeration. Planners should assess the ecological situation at different scales, identify the needs at each scale, and by considering locational possibilities plan a system of multifunctional UGBS. Depending on their size and location within a city, multifunctional UGBS may contribute to achieving neighbourhood and district sustainability and a cleaner environment (Pauleit et al., 2011).

Considering purpose factor may provide an excellent opportunity for planners to consider creation and design of UGBS that may provide opportunities for incidental encounters with nature. Accordingly, planners should not ignore the multifunctional characteristics of transitory and private UGS. Creating transitory green spaces like street trees or green pedestrian corridors may provide opportunities for both incidental and intentional experiences with nature (Beery et al., 2017) as well as generating ES like air cooling and ventilation (Andersson, McPhearson, et al., 2015). Similarly, private gardens significantly contribute to the overall generation of ES in urban areas while providing opportunities for CEB generation to owners and visitors (Schneider et al., 2019). Such opportunities for contact with nature may aid the development of pro-environmental behaviour, and elicit fulfilment and satisfaction.

Planning in bundles may be challenging as different ES require different treatments; for instance, provision of specific ES other than CES (such as water filtration, noise reduction, etc.) often requires very specific planning and management. We should, therefore, put efforts into exploring how to plan urban nature areas to provide simultaneously particular services and opportunities for somewhat vaguer CES. Furthermore, Riechers et al. (2018) found out that certain ES come in specific bundles and that different bundles may have negative influence on each other. We need more research on inter-bundle relations that would inform planning for (C)ES. On the other hand, supposedly aware that people can perceive CES more easily and directly than other ES, planners may use CES as an “alarm clocks” signalling the change in the whole bundle (Andersson, Tengö, et al., 2015). For instance, water areas in cities generate multiple valuable

services such as local air-cooling and pollution filtration. However, most people will first notice a change in aesthetic attributes or opportunities for recreation, i.e. change in CES (Andersson, Tengö, et al., 2015). The shift in the generation of one service often means a change in others, which may not be immediately apparent. Bundling can thus facilitate ES management as well as active participation of ES users in the management and planning of urban ecosystems.

The proposed strategy of creating opportunities for CES generation might seem to be in contrast with giving a specific purpose to a place, but in many individual cases articulating clearly the purpose of a UGBS may be required within the planning process. Whereas creating opportunities in UGBS often means designing places that could be used in diverse ways, certain practices require specific spatial settings or at least specific elements. For instance, certain forms of recreation require trails, bike racks, benches, or water fountains; children may require playgrounds; natural areas like ponds or marshes may require some safety equipment or signage. Giedych and Maksymiuk (2017) argue that designing park equipment with individual character is essential for CEB generation, but it should be done in a participatory manner. On the other hand, other factors of the 5P framework may delimit the future purpose of a place; such are demographic characteristics of potential users (e.g. elderly population), the presence of heritage elements, legal protection status, and traditional use of the site. The latter is an especially important factor for planning as it directly links the place with its users. People will often stand up to defend CES if the traditional purpose of a place is threatened or reduced (Andersson, Tengö, et al., 2015). The inhabitants of the Savica neighbourhood in Zagreb, for instance, stood up against the city's decision to reduce the area of the neighbourhood park to create a space for construction of a church (Čuvamo naš park!, 2017). This example depicts that people often wish to defend greenspace which is a tangible element that they associate with CEB.

Discussion and conclusion

Rapid industrialisation and urbanisation often decrease opportunities for human–nature interactions, especially within cities where now more than half of global population lives (Jaligot et al., 2018; Soga & Gaston, 2016). However, although many societies have become less dependent on locally-generated provisioning and regulating services because of economic development and technological solutions, their dependency on CES increases (Guo et al., 2010). Nevertheless, a systematic approach to planning for CES is in its early stage of development. There are challenges in the application of the concept, which arise from both the character of CES themselves and the introduction of this new aspect to the traditional practice of urban planning. To analyse the challenges, we assessed 109 CES-related papers from WoS database, which provided extensive information on progress in CES field. Further, analysing other databases such as Scopus or Google Scholar would yield an extended set of papers. However, we believe that WoS provided a representative overview of advancements in CES field.

We built a strategy for incorporating CES into urban planning in response to challenges identified. First of all, we identified as an underlying principle that CEB generation is a result of a unique user at a specific place in a particular time, which aligns with Raymond, Giusti, et al.'s (2017) argument that human–environment connections are not solely produced in the mind, but through relations between mind, body, culture and environment through time. Second, we adopted Fish, Church, and Winter's (2016) concept of CES, which provides disambiguation of services and benefits—the uncertainty that has limited the CES concept's transferability to practice. We recognise the need for better discerning between environmental spaces and cultural practices as CES, but we find the concept useful for development of a strategy for incorporating CES into urban planning. Third, we combined Fish, Church, and Winter's (2016) framework with Luck's (2003) concept of SPU to define spatial units viable for planning (environmental spaces), and Beery et al.'s (2017) Incidental Nature Experience Cycle model which we see as a useful means to combat diminishing contact with

nature and improve urban sustainability. Based on assessment of CES (and other ES), the SPU concept enables comparisons between individual SPUs in terms of their success in generating (C)ES and CEB (Andersson, McPhearson, et al., 2015). Furthermore, while Beery et al.'s (2017) model was developed with empirical observational data, we hold that additional testing of the model should be carried out to strengthen its validity.

We proposed a strategy focused on creating opportunities for CES to "hatch" and "grow" rather than planning for specific CES. Instead of 'locking' environmental spaces to provide specific CEB, we believe that the proposed strategy would actually enable generation of myriad more CEB. Furthermore, we advocate strengthening ties between CES and UGBS research and planning practice as they are intertwined in the real world. There are many theoretical and practical findings in the UGBS field that are compatible with CES research and governance (Di Marino et al., 2019; Dickinson & Hobbs, 2017; Giedych & Maksymiuk, 2017) and we encourage urban planners to engage more strongly with these.

Finally, to facilitate the strategy, we developed the 5P framework that outlines five key factors (place, people, past, practices, purpose) that planners should consider when planning for CES. We acknowledge that there are other potential factors that might be relevant when planning for CES, but we focused on those factors that we see as indispensable in early attempts to transfer CES into urban governance. We have attempted to give an outline of relevant determinants within each factor, but we recognise the need for further research and practical engagement.

The proposed strategy may best fit into the UGBS segment of urban planning as CES are one of the main reasons for the creation and maintenance of UGBS (Dickinson & Hobbs, 2017). Incorporating CES in the assessment of UGBS may yield new data to inform planning development and maintenance of UGBS. In such plans, planners can adopt the "hatch" and "grow" strategy when considering the design and spatial distribution of environmental spaces across cities. This links to classical UGBS that enable intentional encounters with nature

as well as spaces where the introduction of urban nature elements can stimulate incidental experiences of nature, alongside the generation of other ES like ventilation, carbon sequestration, stormwater infiltration, etc. (Pauleit et al., 2011). The 5P framework should prove very useful in creating such plans as it facilitates connections of UGBS with CES and helps to improve urban dwellers' wellbeing. We deem the participatory approach pragmatic and advantageous when embracing the strategy for planning for CES, especially considering the subsequent utilisation of planned solutions. The participatory approach seems to be a useful tool for successful solutions as it enables the end-users of UGBS to participate in decisions according to their own needs and desires. Furthermore, they can provide necessary monitoring during the management phase and thus timely warn on change in either ecological status or provision of CES, as well as ES in general.

The application of the strategy in urban planning may be hindered by a lack of knowledge or experience of CES. There needs to greater exchange between research and practice (Radford & James, 2013). Scientific knowledge of CES is often written using terminology which is not easily understood by practitioners (Niemelä et al., 2010). Furthermore, communication between scientists and practitioners is either minimal or inexistent. Secondly, as our review of CES-related papers in WoS showed, applied research is still scarce in the CES field, further slowing down the transfer from research to practice. Another obstacle may occur in the application of participatory processes. Probable deficiencies in knowledge for comprehensive UGBS planning and management among UGBS users may weaken their contribution to the governance processes (Ambrose–Oji et al., 2017). There is still a need for research on how to strengthen their participatory potentials and improve utilisation of their contributions.

Knowledge gaps remain on how accessibility and biophysical features of environmental spaces influence users and their motivation to visit UGBS (L. Zhang et al., 2018). In contrast to rich literature on connections between CES and UGS, there is still a need for more research on the connection between urban blue spaces and CES (Finlay et al., 2015). Research on sense of place and place

attachment is growing, especially in planning context (G. Brown et al., 2015; Verbrugge et al., 2019), but there remains the need for research in that field (Wartmann & Purves, 2018) that might help to better understand cultural benefits, especially the category of 'identities'. Furthermore, more work is needed on how historical use of a UGS affects its current and future use. In addition insights can be gained by studying protests and debates regarding the conversion of UGBS to other land uses (Štulhofer, 1991). We believe that such studies can provide valuable understandings of how people perceive and appreciate CES and CEB. Finally, the issue of ES bundling is still quite challenging to apply in practice and further research on inter-bundle relations will help inform planning UGBS (Riechers et al., 2018; Saidi & Spray, 2018).

The end of PAPER II.

2.3. Positioning the research with the literature review

"…knowledge is often compartmentalised, and to combine knowledge from different sources can help make more systemic sense of different specific knowledge."

Erik Andersson (2021, p. 3),
ecologist and environmental scientist

Even though almost two decades have passed since MEA introduced the ecosystem services concept to global research and practitioners' communities, the practical implementation of CES within planning still struggles. Lacking firm connections of other ecosystem services to natural sciences, CES are in assessments usually either represented solely by prominent representatives (typically recreation) or treated as a residual category after accounting for other services. Recognising this problem, the paper presented in the previous section aimed to identify the challenges in operationalising the CES concept in urban planning and proposed possible remedies. The resulting "hatch and grow" strategy aggregated solutions to identified challenges proposed in the literature. With Fish, Church, and Winter's (2016) CES framework as a foundation and the 5P framework as a backbone, the strategy is devised to navigate and assist planning for urban CES and facilitate research of planning for urban CES.

The contribution of urban nature to the functioning of the society and individual wellbeing have been recognised at least since the industrial age when public UGBS began to be planned and implemented systematically (Bell, 2016; Haase et al., 2018). Given the lack of research about the historical supply of UGBS and production of CES in cities of former Yugoslavia, this study will employ the "hatch and grow" strategy to identify CES for whose co-production the

opportunities were created in UGBS. Returning to the research aims, this study will attempt to reveal how and understand why urban planning accounted for and facilitated experiences of nature in socialist and post-socialist Zagreb and enabled the generation of cultural ecosystem benefits. The comparison between socialist and post-socialist aspects is expected to illuminate and evaluate the role of different planning approaches in facilitating the provision of urban CES. This application will also test the strategy's capacity for exploring the urban planning consideration of CES and should generate valuable insights for both research and practical treatment of urban CES.

2.4. Methodological framework

> *"We suggest that the framework implies a consistency arising from the focus on environmental spaces, practices, goods and benefits but also given the differences between these conceptual entities it highlights the need for methodological plurality to address these entities in an ecosystem assessment. Methods will be needed to interplay and blend together sources and forms of evidence that straddle official and informal, tangible and intangible, as well as cognitive and embodied elements of human interactions with a range of environmental spaces."*
>
> **Robert Fish**, **Andrew Church** and **Michael Winter** (2016, p. 214), creators of the CES research framework

This chapter summarises the overall methodological framework of the thesis. Readers are referred to the methodology sections in each chapter for a more detailed explanation of the methods and materials used in those particular research segments. The methodological framework uses a mixed-methods approach developed from the initial literature review, critical deliberation founded in research and my professional planning experience, and introductory interviews with urban planners in the case study area (Creswell & Plano Clark, 2017; Fish, Church, Willis, et al., 2016; Juntti & Lundy, 2017). It was further informed by insights acquired during field data collection. The framework consists of six stages often carried out simultaneously (Fig. 2.5).

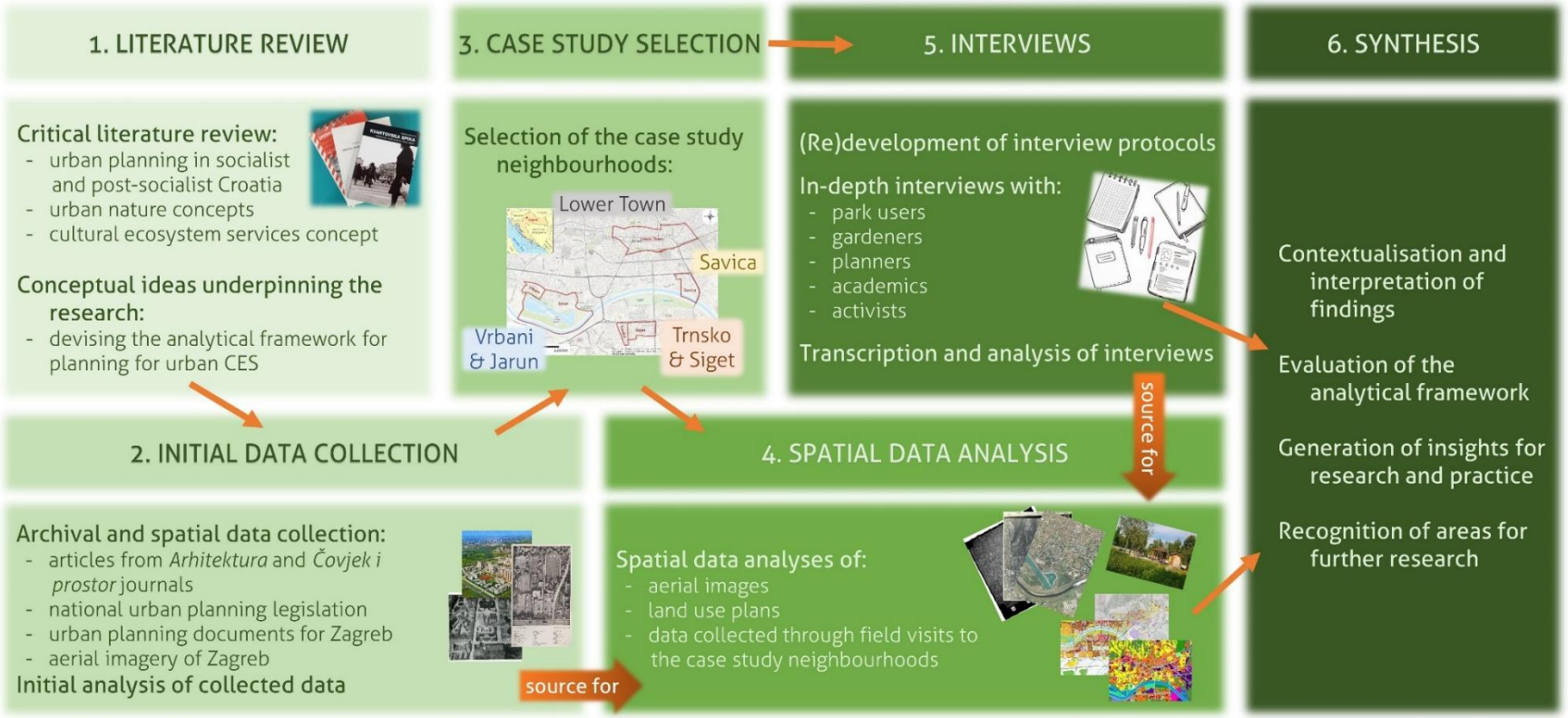

Fig. 2.5. Scheme of the methodological framework.

2.4.1. The study area and period

This thesis studies Zagreb in the period of its most rapid and completely planned spatial expansion and the following period of loosely planned development. The two phases are state socialism (1945–1991) and neoliberal democracy (after 1991). Field data were collected between July 2019 and January 2020 in six neighbourhoods selected to ensure diversity. Neighbourhoods were recognised as the most suitable spatial unit to analyse green space as this unit matters most to residents' living quality (Haaland & Konijnendijk van den Bosch, 2015). The selection criteria were:

(1) time of construction and extensions,

(2) presence of specific types of UGBS (public parks, pocket parks, collective urban gardens, sports and recreation grounds, and UBS), and

(3) availability of historical data sources.

The neighbourhoods selected were the Lower Town, Trnsko, Siget, Savica, Jarun, and Vrbani (Fig. 2.6).

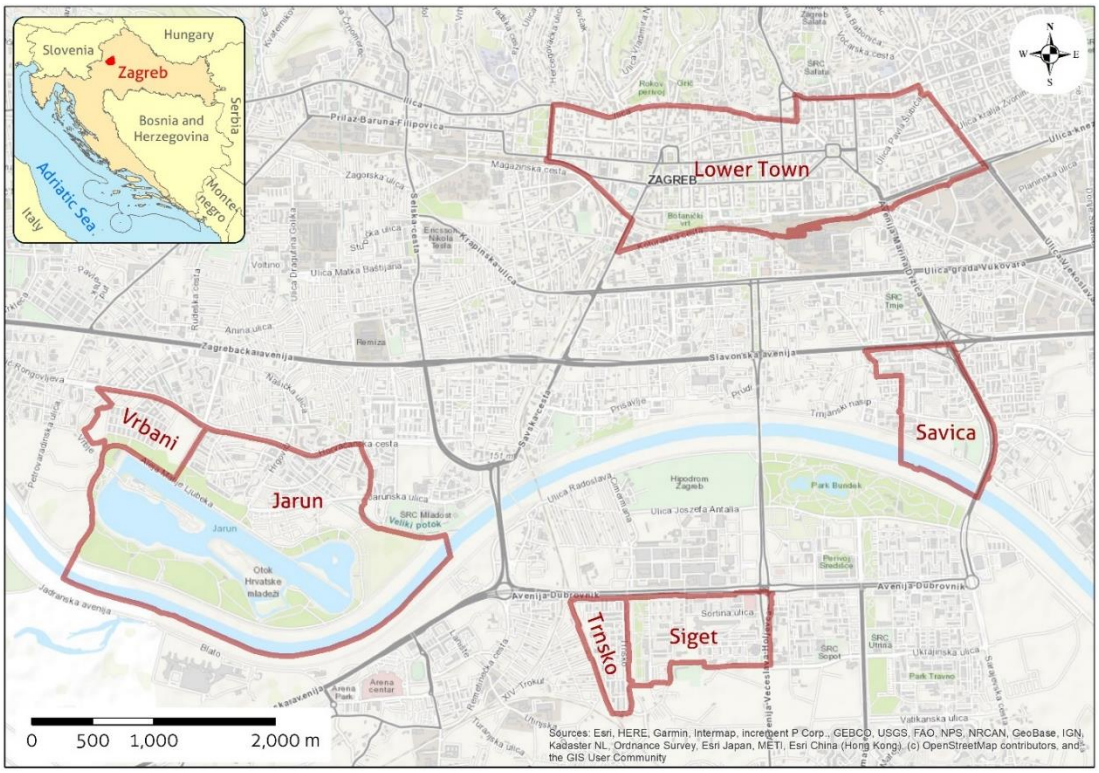

Fig. 2.6. Case study neighbourhoods.

Lower Town

The first plan of Zagreb was drafted in 1865 and although it was never approved by the royal authorities in Vienna and Budapest, it was influential especially under the planner Milan Lenuci (Blau & Rupnik, 2007; Slukan Altić, 2012). The Lower Town was laid out in a regular grid of blocks (2-to-4-storey buildings) and streets with formally designed small public parks. The central park system, known as Green Horseshoe (sometimes also called Lenuci's Horseshoe), has been likened to a smaller version of Vienna's Ringstrasse (Slukan Altić, 2012). With relatively few parks in a regular plan (Fig. 2.7), this neighbourhood best represents the pre-socialist planning approach. Due to the contemporary gentrification, the Lower Town's population is shrinking and ageing (Sviršić Gotovac, 2010).

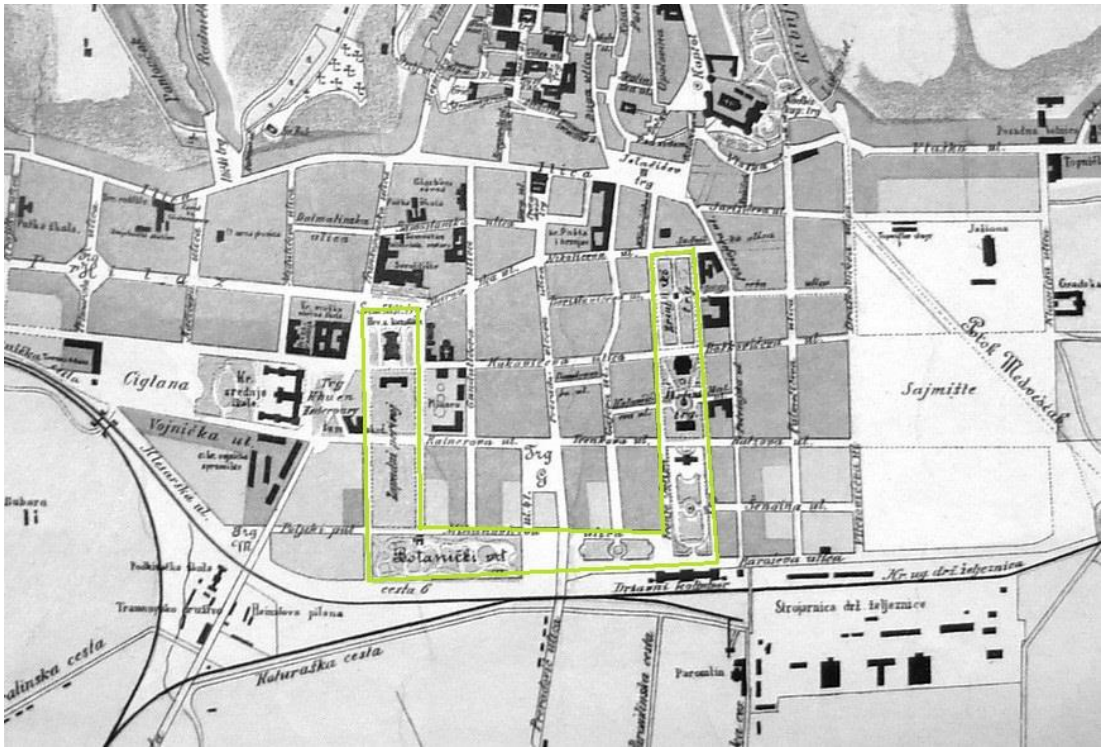

Fig. 2.7. An urban plan of the Lower Town from 1898 (with Green Horseshoe marked by the green line).

Source: Slukan Altić (2012).

Trnsko and Siget

Trnsko was the prototypical socialist neighbourhood in the emerging section of Novi Zagreb. It was planned in 1959–1960 by Mirko Maretić, Zdenko Kolacio, and Josip Uhlik as an autonomous neighbourhood (then called micro-raion) under the name *Novi Zagreb I* (Maretić, 1996). It was changed to Trnsko in 1964 when the whole section south of Sava River, previously known as South Zagreb, was renamed as Novi Zagreb (Medvešek, 2016). Benefiting from land nationalisation, Trnsko was planned as a mixture of housing, social and supply buildings, sports and recreation grounds and public parks nested in a spacious green matrix, following Le Corbusier's concept of 'towers in the park' (Čavlović et al., 2017; Maretić in Cvetnić & Klemenčić, 2008). There are mostly six-storey buildings with seven towers with more than fourteen floors. The horticultural plan of Trnsko was drafted by landscape architect Mira Halambek–Wenzler (Fig. 2.8). Most of the neighbourhood was built between 1961 and 1966, with a few sections finished later on (Maretić, 1996). It has few public parks and several wild urban gardens. Trnsko Neighbourhood was selected as an example of an early socialist Corbusian planning approach.

Once the Trnsko prototype proved feasible, planning and development of other neighbourhoods in Novi Zagreb commenced based on the Preliminary Urban Planning Proposal for South Zagreb of 1962 (Barišić Marenić, 2013). Construction of Siget Neighbourhood began in 1963 between Trnsko and the Brodarski Institute complex, which had been built in the 1950s. The DUP was drafted by Berislav Brnčić and Josip Uhlik in 1969 and regulated construction in the 1970s, with some blocks built over subsequent decades. Due to the relatively long construction period, Siget Neighbourhood represents a transitional mid-socialist planning approach, with Corbusian aspects becoming less important from west to east. Consequently, the height of the neighbourhood decreases in the same direction. In addition, one of the largest parks in Novi Zagreb—Newlyweds Park—is located between Trnsko and Siget and administratively belongs to Siget Neighbourhood (Fig. 2.9). Because of the functional links between the two neighbourhoods, including shared Newlyweds Park and wild

urban gardens, Trnsko and Siget are treated as a single case study area in this research.

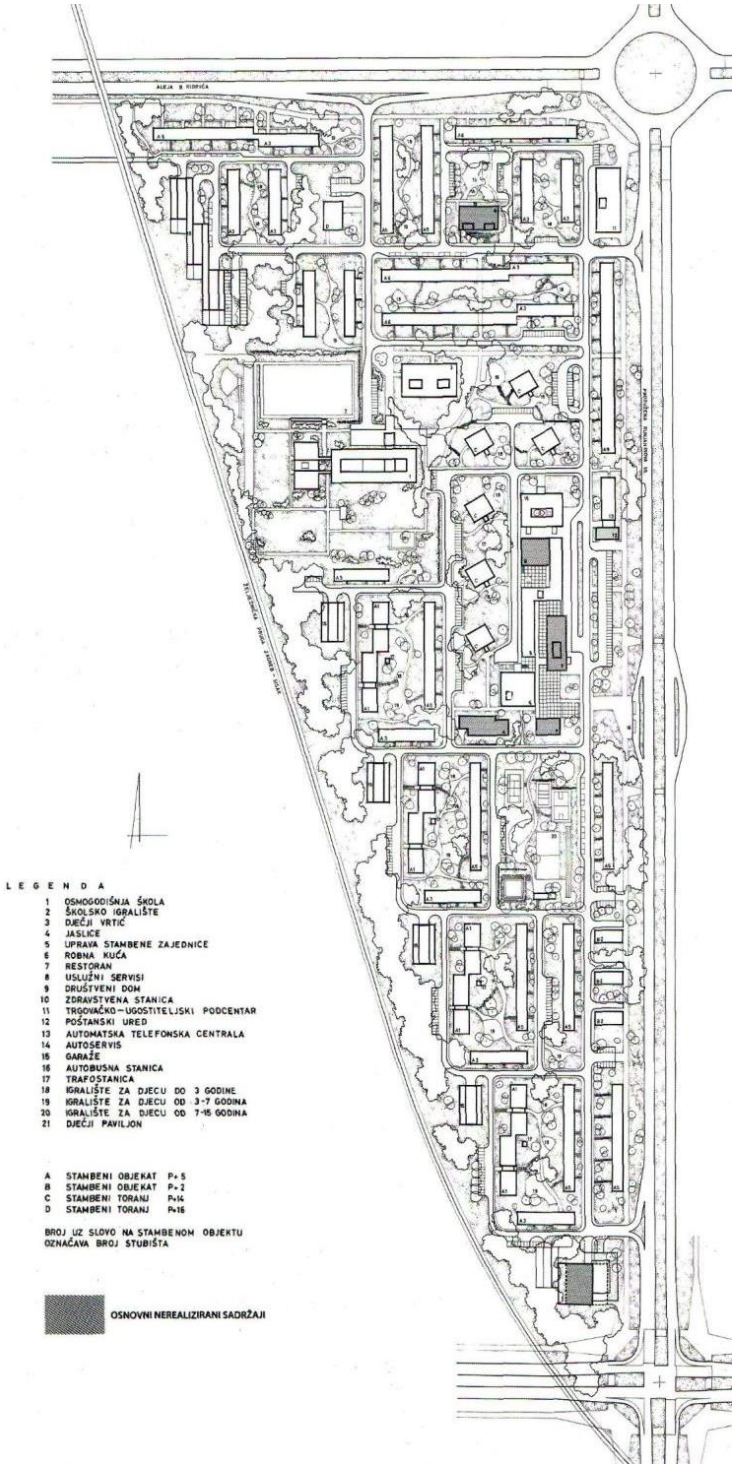

Fig. 2.8. Draft of Trnsko Neighbourhood made by Zagreb Urban Planning Bureau in 1964.

Source: Medvešek (2016).

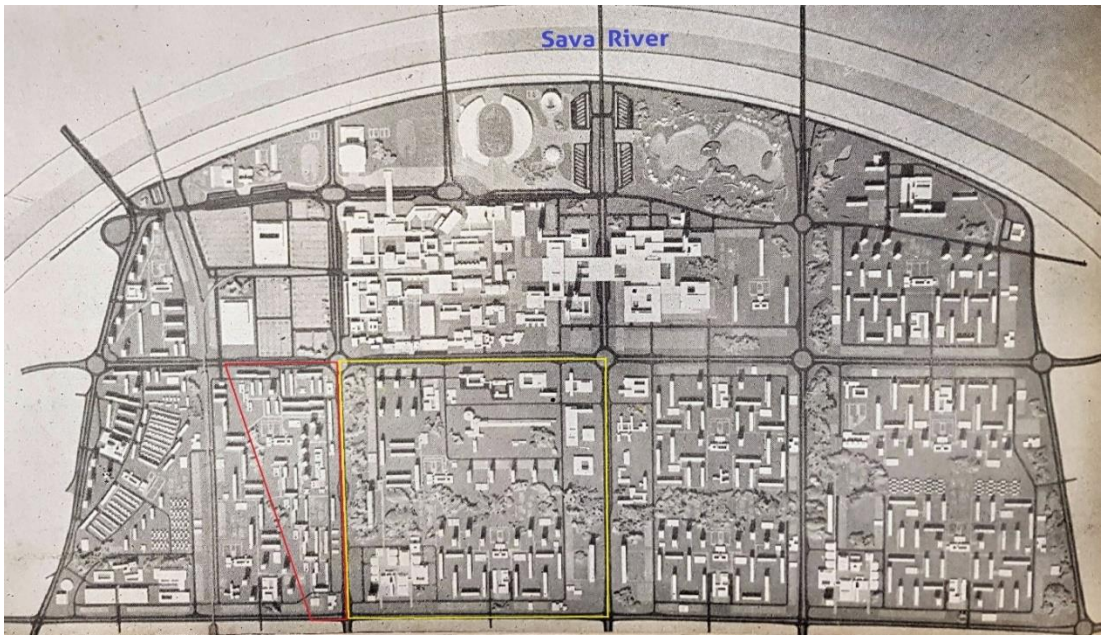

Fig. 2.9. A 3D model of Novi Zagreb, made by the Zagreb Urban Planning Bureau in 1962. Boundaries of Trnsko Neighbourhood marked in red and Siget neighbourhood in yellow.

Source: Kolacio (1962).

Savica

Situated in the southeast corner of Trnje District, Savica slowly developed even before the planned construction of the neighbourhood in the mid-1970s. The first planned buildings were erected in the late 1950s amidst family houses (Stiperski et al., 2013). Following the IUP adopted in 1976, the neighbourhood was constructed between 1976 and 1984 (Fig. 2.10), with 6-to-16-storey buildings and a roughly designed neighbourhood park at its southern edge. South of the park is a green zone designated in all the GUPs as sports and recreation land use, which was implemented only in the eastern part, whereas the western part grew into a thicket where residents eventually established wild urban gardens. Savica was selected as a representative mid- to late socialist neighbourhood with several formal and informal types of UGBS, including wild gardens that were legalised in 2013.

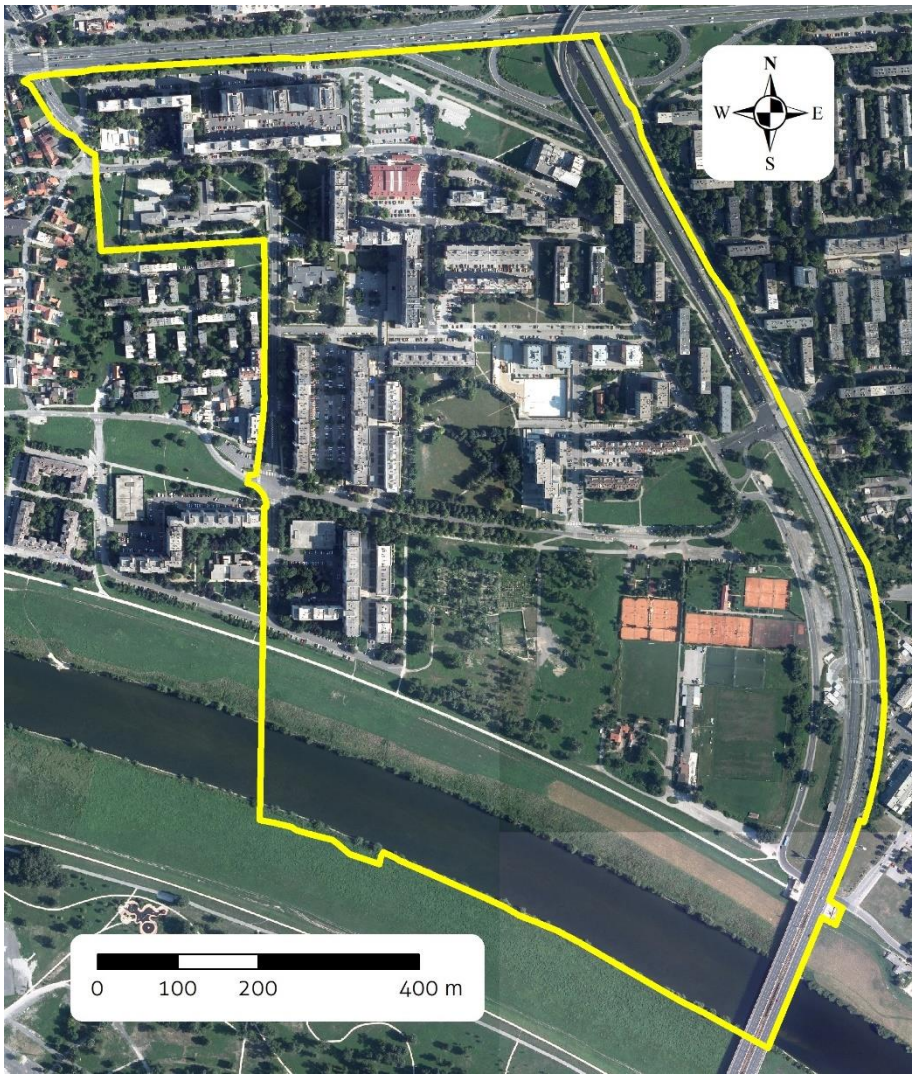

Fig. 2.10. Digital orthophoto of Savica Neighbourhood from 2016.

Jarun and Vrbani

Jarun Neighbourhood originated around the eponymous village near the oxbow lakes of Sava River in southwestern Zagreb. For decades, the gravel from the lakes was exploited to construct socialist neighbourhoods (Jelić, 1990). The area was planned as a green recreation zone since the 1950s but implemented only in the 1980s. Construction of the neighbourhood north of the lake began in 1979, according to the IUP Jarun drafted by the team led by Borislav Doklestić in 1976 (Fig. 2.11). Most of the neighbourhood was finished by 1987 when Jarun Sports and Recreation Complex (SRC Jarun) hosted an international sports event.

Construction in the post-socialist period occurred mainly around the socialist section, with Petrine–Županići sub-neighbourhood built in the early 2000s near the lake shores.

The farmlands northwest of SRC Jarun and west of Jarun Neighbourhood were planned as Vrbani III Neighbourhood (hereafter: Vrbani Neighbourhood) by the team led by Tihomir Jukić in 2005 and constructed over the subsequent decade (Mlinar, 2009). Vrbani and Jarun (including Petrine–Županići sub-neighbourhood) were selected as case study neighbourhoods to compare late socialist and post-socialist planning approaches. There are several formal and informal types of UGBS, including wild gardens, in Jarun Neighbourhood and green patches in Vrbani Neighbourhood. Because of the functional links between the two neighbourhoods, including shared SRC Jarun and wild urban gardens in-between them, Jarun and Vrbani are treated as a single case study area in this research.

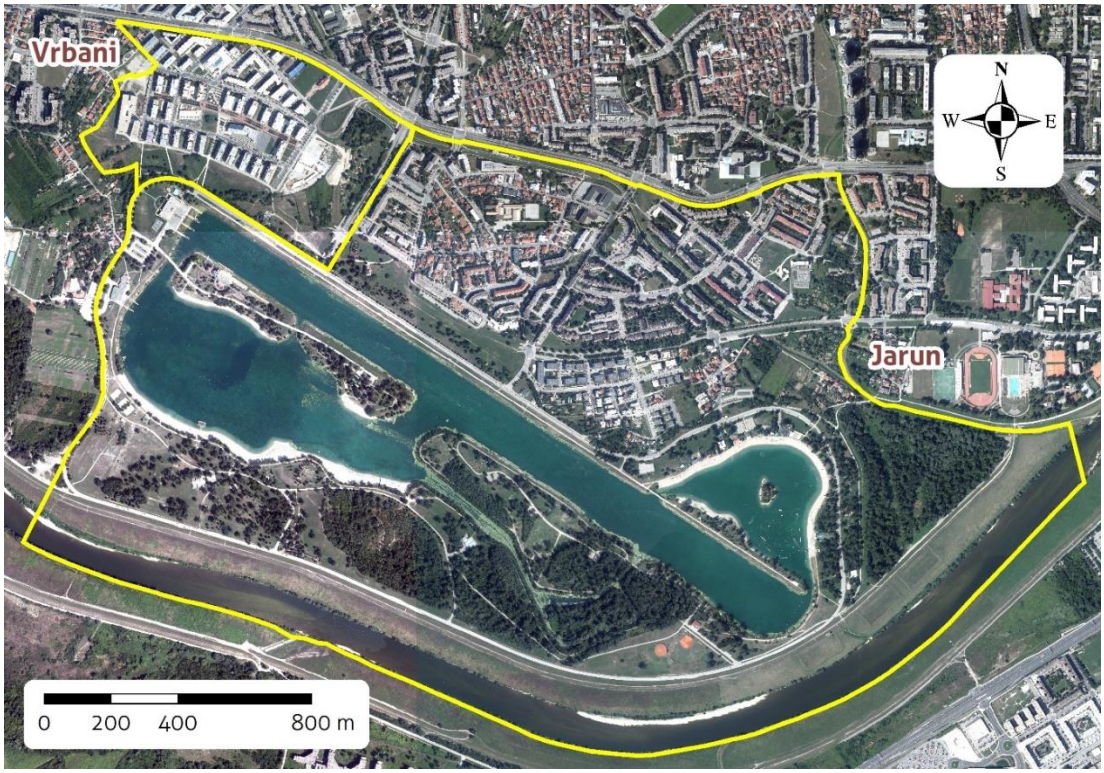

Fig. 2.11. Digital orthophoto of Jarun and Vrbani neighbourhoods from 2016.

2.4.2. Materials and data collection

The data and materials used in the thesis can be grouped into (1) national planning and related legislation; (2) urban planning documents; (3) other documents relevant for urban planning; (4) historic planning articles; (5) aerial images; (6) transcripts of interviews with relevant planning stakeholders; (7) field observations; and (8) field photographs. Data were collected in three main rounds. The first and second rounds involved browsing physical and digital archives (for data in groups 1–4), whereas interviews were conducted in the third round. Aerial images of Zagreb were obtained through data requests from three institutions: Zagreb City Museum (1944 imagery), State Geodetic Administration of the Republic of Croatia (1968 and 2016 imagery), and City Office for Strategic Planning and Development (2003 imagery). Photographs were taken during fieldwork and other visits to Zagreb between 2018 and 2021.

Digital archival work

In order to acquire a good understanding of urban planning policy in socialist and post-socialist Croatia, the IUS-INFO digital archive was searched for national spatial planning legislation. This online legal information system contains catalogued and searchable historical and contemporary legislation and case law. Between November 2018 and January 2019, the IUS-INFO archive provided access to four socialist and three post-socialist spatial planning acts and several other related acts. The overview of legislation accessed is provided in Table 2.1. These data were used in compiling literature reviews and contextualising other collected written and oral data.

Table 2.1. Overview of legislation accessed through IUS-INFO digital archive.

Type of data	Year of adoption	Legislation title in Croatian	Legislation title in English
spatial planning legislation	1949	Osnovna uredba o generalnom urbanističkom planu	Basic Regulation on General Urban Plan
	1961	Zakon o urbanističkom i region-nalnom prostornom planiranju	Urban and Regional Spatial Planning Act
	1973	Zakon o prostornom planiranju i korištenju građevinskog zemljišta	Physical Planning and Construction Land Use Act
	1980	Zakon o prostornom planiranju i uređivanju prostora	Physical Planning and Spatial Organisation Act
	1994	Zakon o prostornom uređenju	Physical Planning Act
	2007	Zakon o prostornom uređenju i gradnji	Physical Planning and Construction Act
	2013	Zakon o prostornom uređenju	Physical Planning Act
other legislation relevant for urban planning	1945	Zakon o zaštiti narodnih dobara i njihovom upravljanju	People's Assets Protection and Management Act
	1947	Osnovni zakon o eksproprijaciji	Basic Expropriation Act
	1957	Zakon o eksproprijaciji	Expropriation Act
	1958	Zakon o nacionalizaciji najamnih zgrada i građevnih zemljišta	Nationalisation of Construction Land Act
	1996	Zakon o privatizaciji	Privatisation Act
	2008	Zakon o arhitektonskim i inženjerskim poslovima i djelatnostima u prostornom uređenju i gradnji	Act on Architecture and Civil Engineering Affairs in Physical Planning and Construction

Archival work in Zagreb

The National and University Library in Zagreb was visited between 24 July and 3 September 2018 and involved browsing, reading, noting and photographing collections of Croatian professional planning journals *Arhitektura* and *Čovjek i prostor* kept in the closed stacks and accessible upon request.

Arhitektura [*Architecture* in English] was published between 1947 and 2008, covering contemporary architectural and urban planning achievements in Croatia and Yugoslavia. *Čovjek i prostor* [*Man and Space* in English] was a periodical published since 1954 covering current topics in architecture, urbanism and arts. Articles in both journals were usually written by architects, landscape architects, urban planners, and historians and critics of urbanism, the majority of whom lived and worked in Zagreb. Journals were searched for articles on urban planning and urban green and blue spaces—including news, reviews, critical analyses, and comments—relevant to Zagreb's case study. In total, 48 articles from *Arhitektura* and 46 from *Čovjek i prostor* were documented. Apart from the textual information, articles were often accompanied by photographs, drawings and sketches (Fig. 2.12). Socialist planners tended to present and elaborate the plan drafts in articles in *Arhitektura* and *Čovjek i prostor*, which aided their analysis and contextualisation.

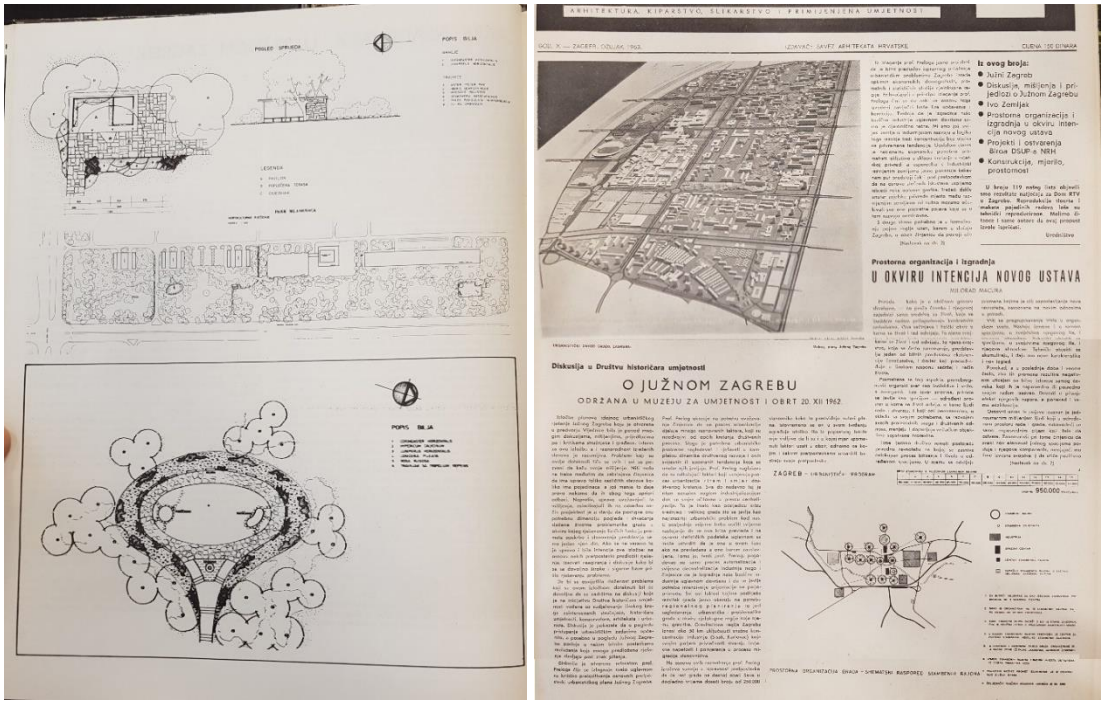

Fig. 2.12. Excerpts from articles from Arhitektura (left) and Čovjek i prostor (right).

Source: left: Klaić (1974, p. 54); right: Domljan (1963, p. 1)

Between 1 and 16 February 2019, I visited the City Office for Strategic Planning and Development of the City in Zagreb, where I accessed their archives and obtained urban plans of Zagreb and other documents relevant for urban planning (Table 2.2).

Table 2.2. Overview of spatial data acquired at the archives of the City Office for the Strategic Planning and Development of the City.

Type of data	Year of the draft	Document title in Croatian	Document title in English	Data format
urban plans	1971	Generalni urbanistički plan grada Zagreba	General Urban Plan of the City of Zagreb	pdf (publication) TIFF (land use plan map)
	1986	Generalni urbanistički plan grada Zagreba	General Urban Plan of the City of Zagreb	pdf (publication) dwg (land use plan map)
	2003	Generalni urbanistički plan grada Zagreba	General Urban Plan of the City of Zagreb	pdf (publication) dwg (land use plan map)
	2016	Generalni urbanistički plan grada Zagreba	General Urban Plan of the City of Zagreb	pdf (publication) dwg (land use plan map)
other documents relevant for urban planning	2003	digitalni ortofoto snimci Zagreba	digital orthophoto images of Zagreb	jpg (images)
	2015	Studija zaštite karaktera krajobraza Grada Zagreba	Study of Landscape Character Protection in the City of Zagreb	pdf (publication)
	2018	Zelena infrastruktura – dječja igrališta	Green Infrastructure – Children Playgrounds	pdf (publication)
	2019	Prostorno planska dokumentacija Zagreba i zagrebačkog područja 20. stoljeća i početka 21. Stoljeća	Physical Planning Documents for the city of Zagreb and its surroundings in the 20th and early 21st century	pdf (publication)

Interviews and field observations

Semi-structured interviews were conducted between July 2019 and January 2020 with 88 individuals from five stakeholder cohorts:

- *park users*—users of parks and UGBS other than collective urban gardens,
- *gardeners*—users of collective urban gardens,
- *planners*—urban planners and decision-makers,
- *academics*—academics from various disciplines, and
- *activists*—activists for formal collective urban gardens and park protection.

The demographics of respondents is given in Table 2.3. Park users and gardeners were approached in parks, collective urban gardens, and sports and recreation complexes in the case study neighbourhoods based on their age and sex to achieve a diverse sample. This was not possible for gardeners due to the small numbers gardening and their unwillingness to participate due to their informal status; this issue is discussed in chapters 4 and 5.

Planners, academics, and activists were approached via email and following their consent for participation, interview date, time, and venue were arranged. Planners were identified in relevant literature and planning documents and sampled to achieve diversity in terms of professional activity in different periods and roles in Zagreb's planning system. Academics interested in urban planning and UGBS studies in Zagreb were identified in the relevant literature and sampled to achieve disciplinary diversity (urbanism, landscape architecture, sociology, geography, ethnology). Finally, activists were selected by analysing media resources covering activist initiatives and actions identified in the literature. Their sampling was guided by the following criteria: participation in actions and initiatives in the case study neighbourhoods or legalisation of collective urban gardens.

Table 2.3. Socio–demographic data on interview participants

Variable	Category	Respondents (%)				
		park users	**gardeners**	**planners**	**academics**	**activists**
Total number		***51***	***10***	***10***	***8***	***9***
gender	male	41	30	50	37	44
	female	59	70	50	63	56
age	18-30	28	0	0	0	0
	31-65	31	30	70	75	100
	66+	41	70	30	25	0
work status	employed	43	0	80	75	100
	student	10	0	0	0	0
	retired	47	100	20	25	0
neighbourhood	Lower Town	12	0	/	/	0
	Savica	25	30	/	/	33
	Siget/Trnsko	16	30	/	/	11
	Jarun/Vrbani	12	30	/	/	0
	other	35	10	50	37	56
Response rate		59	67	39	40	69

Distinct interview protocols were developed for: (1) park users, (2) gardeners, (3) planners and academics, and (4) activists. Protocol questions varied due to different levels of education, expertise and interests; however, they generally covered the same broad topics: use of UGBS in case study areas, perception of CEB from interactions with UGBS, planning of UGBS, grassroots initiatives for establishment of UGBS or their protection from undesirable reconstruction. An overview of topics distribution across participant cohorts is given in Table 2.4. Protocols were structured and administered to enable extending the discussion on any question/topic, which proved especially useful for gathering in-depth data in questions matching respondents' experiences and/or expertise. Interviews lasted between 15 and 172 minutes, primarily

dependent on the cohort, age, talkativeness and available time for conversation. The mean length was 48 minutes. Eighty-five interviews were audio-recorded, and notes were taken for three park users who did not want to be recorded. Further details about interview methods are outlined in methodological sections of chapters 4, 5, 6, and 7.

Table 2.4. An overview of topics distribution across participant cohorts.

Topics	Respondent cohorts				
	park users	**gardeners**	**planners**	**academics**	**activists**
use of UGBS in case study areas					
perception of CEB from interactions with UGBS					
planning of UGBS					
history of collective urban gardens					
grassroots initiatives for establishment of UGBS or their protection from undesirable reconstruction					

During visits to Savica and Newlyweds parks alongside interviews, systematic observations of park use were conducted. In each park, park users' activities were observed and documented for four days in a row, three times a day (morning, early afternoon, dusk) at the same time each day. Observation in Savica Park took time between 20 and 23 August and in Newlyweds Park between 26 and 29 August 2019, each day around 10 a.m., 2 p.m., and 6 p.m. Corresponding observation could not be conducted in the remaining two case study areas due to the much larger areas of the main UGBS (Green Horseshoe and SRC Jarun).

2.4.3. Data analysis

Interviews were transcribed verbatim in Croatian, and the analysis was undertaken in Croatian to avoid loss of meanings and subtle indications that could not be translated into English. Transcribed interviews were organised using the software package NVivo 12 into the three main themes: (1) use of UGBS and perception of CEB, (2) origins and development of collective urban gardens, (3) planning UGBS to provide CES. Data were then coded in two rounds. In the first round, inductive coding was implemented to allow topics to emerge (Fereday & Muir–Cochrane, 2006), which were afterwards grouped in line with themes of the empirical chapters where they were used. More details about data coding are provided in methodological sections of chapters 4, 5, 6, and 7.

In the second round, data from themes (1) and (3) were coded following the "hatch and grow" strategy concept presented in section 2.2. First, environmental spaces, cultural practices and CEB were identified from the responses using Fish, Church, and Winter's (2016) CES framework. Only explicit statements were identified as framework categories, while inferred ones were omitted. The initial codes in each category followed the structure of cultural practices and CEB presented in Fish, Church, and Winter (2016) and were expanded by particular practices and CEB. Second, responses were coded per factors of the 5P framework (place, people, past, purpose, practices).

In order to enable data comparability, observation data were coded using the codebook from interview responses, which was further expanded by cultural practices observed in parks that were not mentioned in interviews. The results are presented in Chapter 5. Land use plan maps from urban plans and aerial images were processed in ArcMap 10.4.1. The processing involved georeferencing the data and digitising UGBS-relevant spatial land-use categories. The detailed procedure is provided in the methodological section in Chapter 3. Textual parts of urban plans were processed using directed content analysis (Hsieh & Shannon, 2005). The procedure is elaborated in the methodological section in Chapter 7.

3. Analysis of the quantitative provision of urban green and blue spaces in socialist and post-socialist Zagreb, Croatia

"Working people have fewer and fewer opportunities for everyday contact with nature while at the same time their need for contact with nature increases as they are bounded with indoor space."

Ivana Jurčić (1976, p. 89),
horticulturist in Zagreb

This chapter has been written as a research paper and submitted to *Urban Ecosystems* in 2022.

The paper addresses the second research objective by reconstructing the change in spatial patterns of the planned and provided UGBS and identifying the agencies that regulated that process over time. To do so, it overlays aerial images of Zagreb from four different periods and five land-use plan maps from five periods between 1944 and 2016. The spatio–temporal changes in UGBS provide a foundation for understanding human–ecosystem interactions in Zagreb across the socialist and post-socialist periods. The changes are interpreted in the context of contemporary planning, socio-political and economic circumstances. Analyses point to the potential of socialist and post-socialist planning to provide opportunities for meaningful nature experiences and the generation of CEB.

PAPER III

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Status of the paper: **submitted to *Urban Ecosystems***

Abstract

Research has shown that many urban dwellers are increasingly alienated from nature. The provision of urban nature sites largely depends on a city's socio-political context. Our study explored the provision of urban green and blue spaces (UGBS) in Zagreb, Croatia, over the socialist and post-socialist periods (1945–2016). We analysed and compared data from aerial images (from 1944, 1968, 2003 and 2016) and general urban plans of Zagreb (from 1953, 1971, 1986, 2003 and 2016) for five case study neighbourhoods. The findings indicate that the Yugoslav socialist regime provided abundant UGBS in Zagreb. These were mainly preserved over the post-socialist period, but not many new UGBS areas were created. The comparison of planned and implemented UGBS in neighbourhoods originating in different parts of the two periods allowed us to outline the patterns and processes that have led to changes in the provision of UGBS, discrepancies between planned and implemented UGBS and differences in the provision over time. Contemporary residents of Zagreb have many opportunities for interaction with urban nature, thanks to UGBS provided before 1991. Our findings provide a foundation for further qualitative research, which could provide valuable insights into UGBS planning to enhance contributions to human wellbeing and achieve urban sustainability.

Keywords: socialist city, urban green and blue spaces, urban nature, urban planning, Zagreb

Introduction

Between 1992 and 2016, the world's urban areas more than doubled (He et al., 2019) due to rapid urban population growth (United Nations, 2018). Urbanisation increases infrastructure and resource efficiency (Knox & Pinch, 2010) but can diminish the availability of nature to urban residents. Urban green and blue spaces (UGBS) started being planned to improve health conditions and recuperation from work (Haase et al., 2018). UGBS is an umbrella term for urban green spaces (UGS), which involve public open spaces with a high degree of vegetation cover (Schipperijn et al., 2013), and urban blue spaces (UBS), which correspond to publicly accessible aquatic environments in urban areas (Raymond et al., 2016). We are becoming more and more aware of the importance of urban nature for the sustainability and resilience of urban social-ecological systems (Andersson et al., 2019). Urban ecosystems provide diverse ecosystem services—from air filtration and cooling, carbon sequestration and contributions to psychological and mental wellbeing (Gómez–Baggethun & Barton, 2013; Kabisch, 2015).

Yet, studies have shown that urbanisation often leads to diminishing contact with nature resulting in alienation from nature, decreasing awareness of its benefits and consequently diminished care for its protection (Cox et al., 2017; Soga & Gaston, 2016). Researchers have called for approaches reconnecting urban dwellers with nature (Colding et al., 2020; Ives et al., 2018). The cultural ecosystem services concept is recognised as a useful approach as people can perceive and experience cultural services more directly than many other services (Andersson, Tengö, et al., 2015). Cultural ecosystem services are usually the reason why people choose to visit and spend time in UGBS. They provide opportunities for recreation, meditation, relaxation, exercise, knowledge acquisition, socialising, place attachment, and other forms of beneficial contact with nature. Tandarić et al. (2020) proposed that providing diverse and well-distributed UGBS across urban space is likely to attract users to such spaces and increase the generation of cultural services, hence reconnecting urbanites with nature (Ives et al., 2018; Soga & Gaston, 2016).

Despite the rich socio-political history of 20th-century Europe, little is known about how socio-political dynamics influence the provision of UGBS and facilitate the generation of cultural services (Kosanic & Petzold, 2020). The socialist ideology subordinated urban planning to highly centralised economic planning (Hirt, 2015), yet studies have shown that socialist regimes provided abundant UGBS across Eastern Europe in the 20th century (Badiu et al., 2019; Hirt, 2013). Eastern European post-socialist cities hence offer an ideal case study for exploring this phenomenon by analysing the transition from socialist to the post-socialist political-ideological system. The transition to the market economy after 1990 radically changed the planning approach, which was reflected through contrasts between socialist and post-socialist urban sections (Badiu et al., 2019; Blau & Rupnik, 2007; Haase et al., 2018) and subjecting urban nature to the marketisation of land (Haase et al., 2017, 2018). This is also true for Croatia, where construction pressure on land increased enormously, threatening even spaces reserved for parks (Šimpraga, 2011).

A small number of studies of UGBS in socialist and post-socialist contexts have focused on Eastern Bloc countries (e.g. Badiu et al., 2019; Haase et al., 2018; Kabisch et al., 2016; Zupan & Büdenbender, 2018), with a few studies on former Yugoslavia (Vasiljević et al., 2018). In addition, there are no studies of cross-temporal change in UGBS areas over socialist and post-socialist periods focused on former Yugoslav republics. It is essential to understand how planning regimes can leave legacies in urban form as this affects our ability to assess and enhance the cultural ecosystem services provided. Analysing the planning and implementation of UGBS in different socio-political settings with differing outcomes established may provide insights into how different planning approaches create opportunities for and stimulate human–nature interactions. This paper fills that gap by examining the change in planning and provision of UGBS in Zagreb throughout the socialist and post-socialist periods. As Croatia's capital, Zagreb has been a lively arena where the socialist and post-socialist regimes' values for UGBS have been continuously reflected in urban space. Over the last 70 years, these changes have been documented in aerial images, urban

plans, planners and critics' appraisals and scientific studies. We set the following research questions:

1. How has the provision of UGBS changed across the socialist and post-socialist periods?
2. To what degree were planned UGBS implemented over the socialist and post-socialist periods?

Urban planning context in Zagreb

Formal urban planning in Zagreb began in 1865 when the very first plan regulated the expansion of the city to the area now known as the Lower Town, which shortly became the new central quarter. The four plans adopted in the pre-socialist period primarily regulated the development of the expanding Lower Town and nearby neighbourhoods. The first socialist urban plan was finished in 1953, but it was never adopted due to the extensive costs of the proposed solutions for the post-war conditions (M., 1954). As many urban planners in the inter-war period were schooled across Europe, they engaged with Le Corbusier's functionalist approaches (Blau & Rupnik, 2007). The authors of the 1953 Plan imagined Zagreb as Corbusian "towers in the park", proposing extensive green spaces surrounding buildings.

Rapid industrialisation in the 1950s attracted a huge influx of incomers who required housing. By the end of the decade, Zagreb had begun to spread south of Sava River with the construction of Novi Zagreb (Korov, 2012). The rapid expansion was facilitated by state-appropriated agricultural lands (Stojan & Čaldarović, 2006). Although not adopted, the 1953 Plan influenced the planning of new neighbourhoods, while the improving economic situation allowed the implementation of the Corbusian greenspace matrix (Cvetnić & Klemenčić, 2008). In 1971, the first General Urban Plan (GUP) was adopted, prescribing standards for UGBS areas within neighbourhoods and districts. While the Corbusian concept was not explicitly referred to, the 1971 GUP operationalised it through a provision stating: "To ensure minimum of hygienic and health conditions, green and recreation spaces should occupy at least 60% of a neighbourhood area" (GUP,

1971, p. 18). However, the Corbusian conception weakened in the 1970s as a result of postmodernist impulses and the deterioration of the economic situation (Gulin Zrnić & Vranić, 2015). The 1986 GUP allowed buildings to be built more densely and reduced the area of UGBS.

The 1986 GUP was loosely implemented in the 1990s as private investors became the main land developers, who sought greater freedom in development projects. The first post-socialist GUP was adopted in 2003. This introduced the city projects instrument and shifted the power from planners to politicians. It generalised the city territory into three categories based on the degree of urban consolidation. The UGBS standards were replaced with four categories of public green spaces and two categories of sports and recreation facilities—all differing in the degree of construction allowed in them. The plan was amended in 2007, 2009, 2013 and 2016, mostly with limited location-based changes to the land-use plan. Most of the UGBS planned and implemented in the socialist period were transferred to the new plan, but new UGBS were seldom planned.

Methods

Study area

Zagreb is Croatia's largest city and its political, cultural and economic centre and capital. The analysis was conducted in six case study neighbourhoods: Lower Town, Trnsko, Siget, Savica, Jarun and Vrbani (Fig. 3.1), selected to ensure representation of a variety of construction periods and diversity of UGBS. The Lower Town is the central quarter, with UGS mostly originating from the pre-socialist period. Trnsko and Siget were planned and built in the 1960s and early 1970s in Novi Zagreb and are characterised by extensive greenspace surrounding buildings. The two neighbourhoods share some UGS, and as such we consider them a single case study unit. Savica and Jarun neighbourhoods were planned when the modernist approach was weakening, resulting in a reduced share of UGBS compared to Trnsko and Siget. Savica was built in the 1970s and '80s, whereas the construction of Jarun began in the 1980s and continued in the 1990s.

Finally, Vrbani Neighbourhood was planned and built in the 2000s following the post-socialist planning approach. As Vrbani and Jarun neighbourhoods are functionally linked, we consider them a single case study unit.

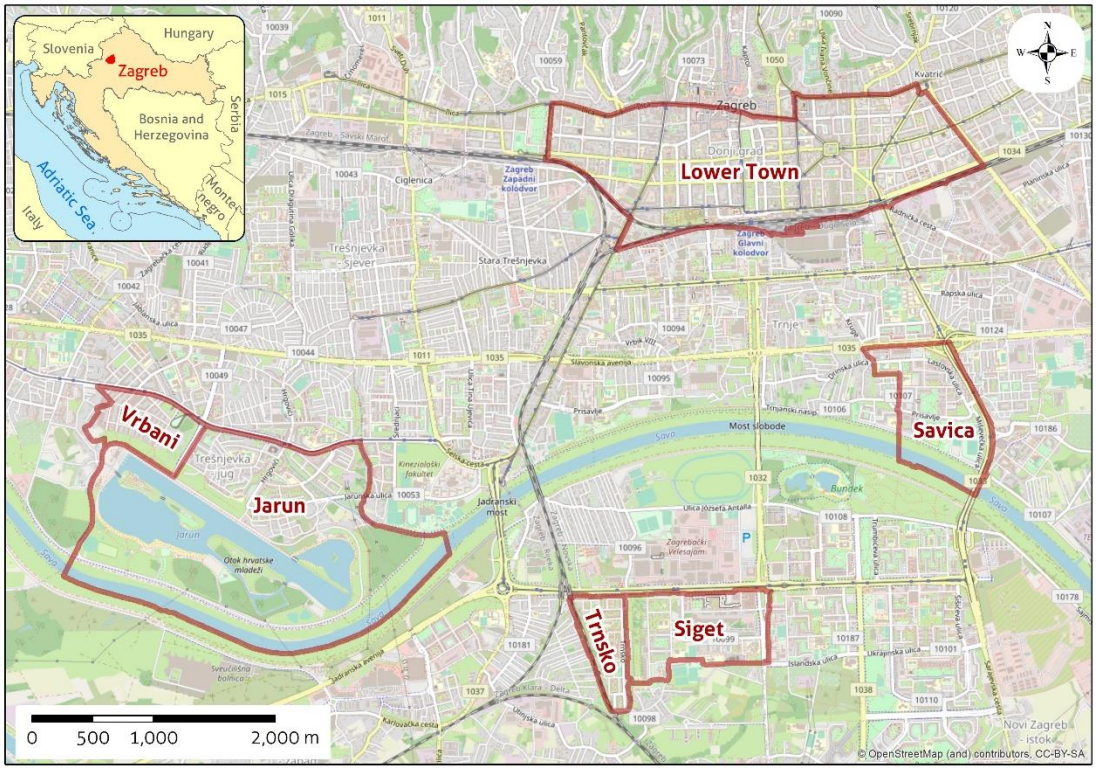

Fig. 3.1. Spatial distribution of six case study neighbourhoods.

Materials

The analysis of change in the provision of UGBS was done by combining two data sources: aerial images of Zagreb and planned land use maps from GUPs (Table 3.1). The aerial images were collected for four reference years (1944, 1968, 2003, 2016), while GUPs were collected for five years (1953, 1971, 1986, 2003, 2016) to cover the 1944–2016 period as evenly as possible. There were no aerial images between 1968 and 2003 while those from 1944 and 1968 were black and white. Preparation of materials involved their georeferencing in ArcMap 10.4.1. The interpretation of spatial data was assisted with elaborations from GUPs.

Table 3.1. Sources of the main materials.

Period	Socialist period	Post-socialist period
Aerial imagery	*1944*: Zagreb City Museum *1968*: State Geodesy Administration	*2003*: City Office for Strategic Planning and Development *2016*: State Geodesy Administration
Urban plans	*Directive Regulation Plan of Zagreb (1953)*: Antolić (1953) *Zagreb General Urban Plan (1971):* Zagreb Physical Planning Bureau *Zagreb General Urban Plan (1986)*: City Office for Strategic Planning and Development	*Zagreb General Urban Plan (2003)*: City Office for Strategic Planning and Development *Zagreb General Urban Plan (2016)*: City Office for Strategic Planning and Development

Data processing

First, the legend for digitising UGBS was based on categories from GUPs, which were complemented with non-planned categories from aerial images during digitisation. The final legend included: UGS, UBS and wild or neglected green and blue patches (Table 3.2). Wild and neglected patches were easily recognised by distinct colours and patterns of vegetation. They were digitised because they usually represented UGBS or undeveloped land plots with naturally regenerating vegetation. Here we included collective urban gardens which informally originated on partly cleared wild or neglected patches.

Second, all UGBS areas from aerial images for the study areas were digitised, starting from 2016 and retrogressing towards the images from earlier periods. The smallest UGBS area digitised was that equalling the canopy of a single mature deciduous tree. The resulting map served as a basis for digitising changes in UGBS from an older image. We found such an approach useful as the resolution of recent images was higher and enabled greater digitising precision. In subsequent (earlier) images, we digitised the changes in spatial coverage of UGBS while retaining the unchanged boundaries. This facilitated avoiding possible mismatches between years, possibly caused by image distortions and difficulties in determining boundaries due to shadows on black and white images. The

resulting maps were used for the detailed analysis of changes in the spatial distribution of UGBS between 1944 and 2016.

Table 3.2. Legend for mapping planned and implemented UGBS.

(Semi-)natural spaces	Examples of UGS/UBS included
UGS	parks, sports and recreation grounds, greenspaces surrounding buildings, green patches and strips separating residential areas or sidewalks from thoroughfares, meadows, meadows with sparse trees, urban forests
UBS	river, streams, lakes
wild or neglected green patches	thickets, neglected plots, collective urban gardens
wild or neglected blue patches	wetlands

Third, all planned UGBS from each GUP were digitised. The resulting maps were used to analyse temporal change in the planned spatial distribution of UGBS. Fourth, to analyse the implementation of planned UGBS, the maps based on plans were overlaid with maps resulting from aerial imagery in consecutive intervals (1953/1968, 1971&1986/2003, 2003/2016). Due to the lack of aerial images between the 1971 GUP and 1986 GUP adoption dates, we overlaid planned land use maps from both GUPs with the map resulting from aerial images from 2003, and the status of implemented UGBS was ascribed to each UGBS area that overlapped with UGBS planned in either plan (i.e. implemented as planned in 1971 GUP, implemented as planned in 1986 GUP, or implemented as planned in both plans). In cases where the two GUPs planned different types of UGBS in the same location, only the overlapping between the 1986 GUP and 2003 aerial image was considered. Because of the mismatch between reference time points for aerial images and plans in the socialist period, the results pertain to all UGBS identified from the images rather than only those implemented in the analysed interval. Digitising and map overlaying were done in ArcMap (ArcGIS 10.4).

Results

Provision of UGBS

The change in provided UGBS in the case study neighbourhoods between 1944 and 2016 is shown in Table 3.3. The Lower Town was the only case study neighbourhood that existed in 1944. UGS made up only 9.0% of the neighbourhood area and were almost entirely retained by 1968. There were no UBS. In 1968, the construction of Trnsko Neighbourhood was nearly completed, and Siget was in construction. The increase in the proportion of UGS (to 24.1%) in the total area of those three neighbourhoods was almost entirely a result of a high proportion of UGS in Trnsko and Siget neighbourhoods. This figure is somewhat inflated by plots reserved for development (primarily in Siget) that were grassed as a temporary measure. More than three-quarters of UGS in those three neighbourhoods were retained by 2003.

Savica and Jarun areas had a peri-urban character with mixed residential, agricultural and grassland land-use categories in 1944. Sava River and its backwater lakes covered between 11.2% and 18.5% of the territory in the Savica and Jarun areas, respectively. Even though Savica and Jarun neighbourhoods were yet to be constructed, data show that almost two-thirds of the UGS area and over four-fifths of UBS area in those neighbourhoods were retained between 1968 and 2003. In Jarun, this corresponds to the southern part of the neighbourhood that was transformed into a sports and recreation complex retaining and landscaping many of the pre-existing wooded spaces and backwater lakes as well as the river with its bank and levee. The latter also accounted for most retained UGBS in Savica Neighbourhood in that interval.

By 2003, when all case study neighbourhoods except Vrbani were completed or nearly completed, the total UGBS area increased to 51.2% as a result of urbanisation of farmlands in Jarun and Savica neighbourhoods, which involved the creation of a significant amount of UGS, as well as the conversion of backwater lakes in Jarun into a large lake surrounded by sports and recreational green spaces. The backwaters in Savica were developed into a housing zone with

Table 3.3. Change in provided UGBS in case study neighbourhoods between 1944 and 2016.

Case study neighbour-hoods	UG/BS	share in the total area of constructed neighbourhoods (%)				retained (%)			
		1944	1968	2003	2016	1944 to 1968	1968 to 2003	2003 to 2016	through-out the whole studied period*
Total area (ha) of constructed neighbourhoods		301.8	404.4	901.4	901.4	/	/	/	/
Constructed neighbour-hoods (901.4 ha)	UGS	9.0	24.1	37.5	38.1	97.7	76.0	98.4	83.2
	UBS	0.0	0.0	13.1	13.1	n/a	*87.2*	99.9	99.7
	UGBS	**9.0**	**24.1**	**50.6**	**51.3**	**97.7**	**76.0**	**98.8**	**87.2**
Lower Town (301.8 ha)	UGS	9.0	9.9	11.0	11.2	97.7	96.5	98.0	72.6
	UBS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	UGBS	**9.0**	**9.9**	**11.0**	**11.2**	**97.7**	**96.5**	**98.0**	**72.6**
Trnsko & Siget (102.6 ha)	UGS	*NDA*	65.8	51.2	52.1	*NDA*	66.9	98.4	59.3
	UBS	*NDA*	0.0	0.0	0.0	*NDA*	0.0	0.0	0.0
	UGBS	***NDA***	**65.8**	**51.2**	**52.1**	***NDA***	**66.9**	**98.4**	**59.3**
Savica (76.8 ha)	UGS	*n/a*	*28.3*	41.3	47.5	*n/a*	*63.6*	98.3	84.2
	UBS	*n/a*	*11.2*	9.3	9.3	*n/a*	*83.1*	100.0	100.0
	UGBS	***n/a***	***39.5***	**50.6**	**56.8**	***n/a***	***69.2***	**98.6**	**86.8**
Jarun & Vrbani (420.3)	UGS	*n/a*	*34.1*	50.0	52.3	*n/a*	*66.9*	98.4	92.8
	UBS	*n/a*	*18.5*	26.4	26.5	*n/a*	*87.7*	99.9	99.7
	UGBS	***n/a***	***52.6***	**76.4**	**78.8**	***n/a***	***87.0***	**99.0**	**95.1**

** 1944–2016 for the Lower Town, 1968–2016 for Trnsko and Siget, and 2003–2016 for Savica, Jarun and Vrbani neighbourhoods.*

Note: Cell values in italic correspond to the period when corresponding neighbourhoods were not yet constructed.

amenity greenspace (west part) and sports and recreation zone (east part), whereas the central part was neglected and became overgrown, providing the opportunity for wild collective gardens. The UGS area in Trnsko and Siget

neighbourhoods declined in this period due to infilling some green spaces with buildings and neglect of others (some of which were overtaken by residents who converted them into wild collective gardens). The changes in Trnsko and Siget were precisely why the total proportion of the retained UGS area in the 1968–2003 interval fell to 76.0%.

The 2003–2016 period was characterised by stagnation in the total UGBS area with a notable increase only in Savica Neighbourhood, where the overgrown area was cleared and maintained. Almost all UGBS in that period were retained. Overall, the UGBS and its share in the neighbourhood area greatly increased over the socialist period and then mainly stagnated in the post-socialist period. As expected, the majority of the entire UGBS area survived throughout all studied years (Fig. 3.2). In the Lower Town, Trnsko and Siget neighbourhoods which existed through more than one time interval, the proportion of retained UGS throughout all the years was smaller (72.6% and 59.3%, respectively) than in Savica, Jarun and Vrbani (above 84%), which were studied only for change in the 2003–2016 interval due to the late period of construction.

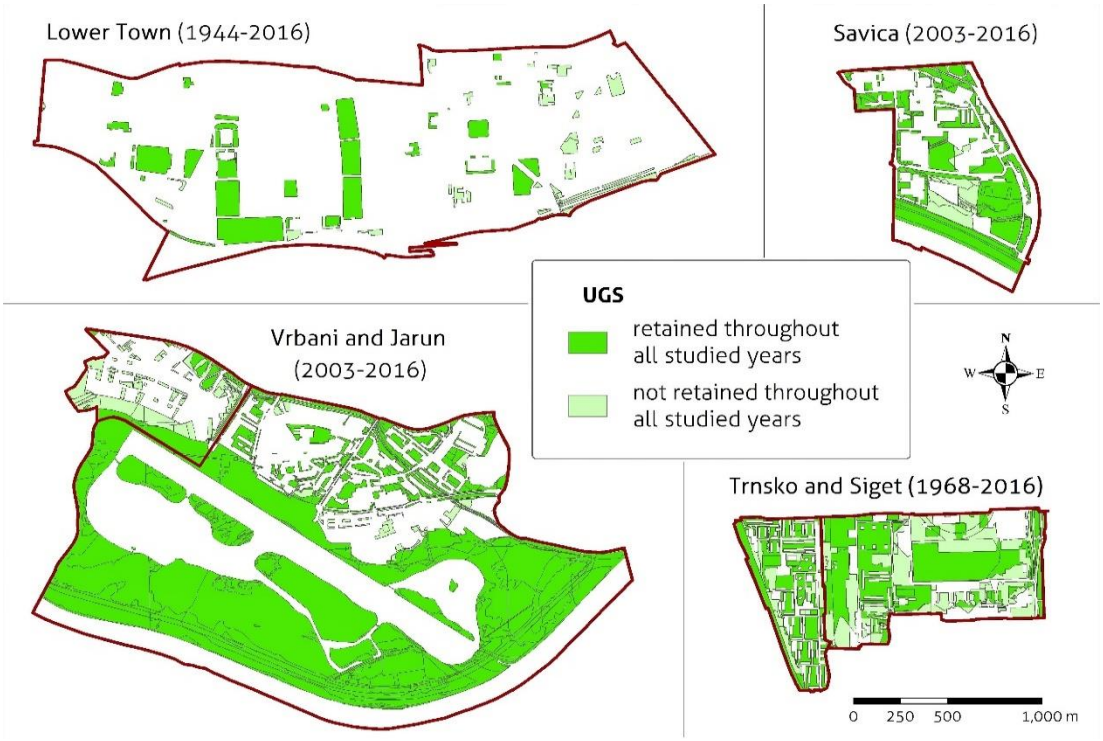

Fig. 3.2. Overview of retained and not retained urban green spaces in case study neighbourhoods between 1944 and 2016.

Planned UGBS

We show the change in planned UGBS areas in the case study neighbourhoods between 1953 and 2016 in Table 3.4. In the 1953 Plan, the outskirts of the city were mainly planned as a green, recreational zone. For that reason, the data for 1953 deviate from the trend set by the other plans. Interestingly, only half of UGS area planned for the Lower Town in 1953 were retained in the 1971 GUP. At the aggregate level, the total planned UGBS area grew negligibly between 1971 and 2003, after which it slightly shrunk. The 1986 GUP instigated a deviation in the trend (visible especially in Trnsko and Siget) for two reasons. First, its methodology included drafting existing small UGS in the land use plan, which were not drafted in previous nor following plans. This resulted in the smaller anticipated UGS area in the newest neighbourhoods (Savica and Jarun) and larger in the Lower Town, Trnsko and Siget (Fig. 3.3) in comparison to other relevant plans. Second, the 1986 GUP designated the Sava Riverbanks as part of the river (hence UBS), due to which the total planned UGS area in Savica and Jarun neighbourhoods was smaller than in other plans. Consequently, the proportion of retained UGS area deviated in 1986, and the proportion of retained UBS area deviated in 2003.

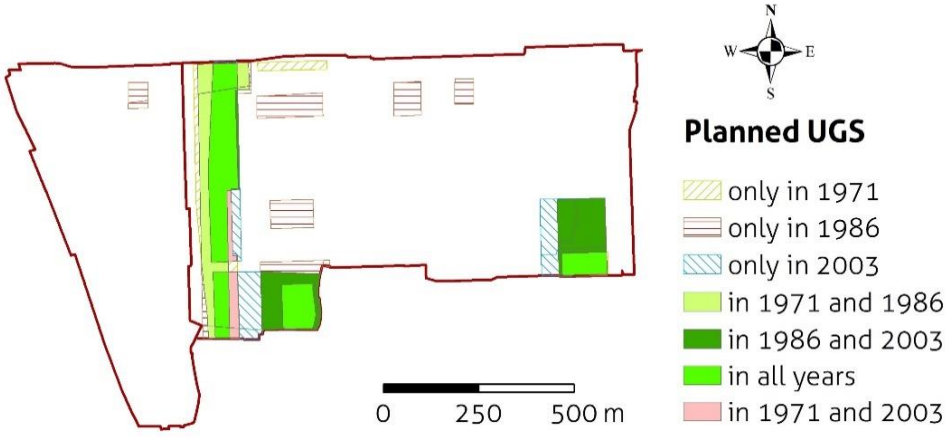

Fig. 3.3. Examples of changes in UGS included in plans between 1971 and 2003 in Trnsko and Siget neighbourhoods.

Table 3.4. Change in planned UGBS in case study neighbourhoods between 1953 and 2016

Case study neighbour-hoods	UG/BS	share in the total area of planned neighbourhoods (%)					retained (%)				
		1953 Plan	**1971 GUP**	**1986 GUP**	**2003 GUP**	**2016 GUP**	**in 1971 GUP from 1953 Plan**	**in 1986 GUP from 1971 GUP**	**in 2003 GUP from 1986 GUP**	**in 2016 GUP from 2003 GUP**	***in all plans****
Total area of constructed neighbourhoods (ha)		301.8	901.4	901.4	901.4	901.4	/	/	/	/	/
Constructed neighbour-hoods (901.4 ha)	UGS	11.7	28.0	26.7	29.1	29.0	50.4	75.6	89.0	98.1	50.4
	UBS	0.0	12.2	14.6	13.2	13.2	n/a	91.4	85.1	99.8	65.2
	UGBS	**11.7**	**40.1**	**41.4**	**42.3**	**42.2**	**50.4**	**80.4**	**87.6**	**98.6**	**54.8**
Lower Town (301.8 ha)	UGS	11.7	8.1	9.5	9.8	9.4	50.4	87.7	75.7	90.6	30.5
	UBS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	UGBS	**11.7**	**8.1**	**9.5**	**9.8**	**9.4**	**50.4**	**87.7**	**75.7**	**90.6**	**30.5**
Trnsko & Siget (102.6 ha)	UGS	*52.4*	11.5	14.6	9.2	9.8	*n/a*	74.2	51.9	99.0	28.2
	UBS	*0.0*	0.0	0.0	0.0	0.0	*n/a*	0.0	0.0	0.0	0.0
	UGBS	**52.4**	**11.5**	**14.6**	**9.2**	**9.8**	***n/a***	**74.2**	**51.9**	**99.0**	**28.2**
Savica (76.8 ha)	UGS	*59.9*	24.1	19.4	31.6	31.8	*n/a*	63.6	97.1	98.7	44.3
	UBS	*7.6*	8.8	14.0	9.2	9.0	*n/a*	100.0	64.6	97.4	61.1
	UGBS	**67.4**	**32.9**	**33.5**	**40.8**	**40.8**	***n/a***	**73.4**	**83.5**	**98.4**	**49.2**
Jarun & Vrbani (420.3)	UGS	*64.8*	46.9	43.4	47.4	47.3	*n/a*	75.3	93.5	99.1	57.0
	UBS	*11.7*	24.5	28.9	26.6	26.6	*n/a*	90.8	86.9	99.9	65.5
	UGBS	**76.5**	**71.5**	**72.3**	**74.0**	**73.9**	**n/a**	**80.6**	**90.9**	**99.4**	**60.0**

** 1944–2016 for the Lower Town, 1968–2016 for Trnsko and Siget, and 2003–2016 for Savica, Jarun and Vrbani neighbourhoods.*

Note: Cell values in italic correspond to the period when corresponding neighbourhoods were not yet planned.

The slight decrease in the total planned UGBS area in 2016 resulted from reducing the total UGS area in the Lower Town and Jarun. The reduction in the Lower Town was primarily a result of excluding pavements surrounding parks on squares that were previously included in the planned UGS area (Fig. 3.4). The 2016 GUP retained virtually the entire UGS and UBS area planned in the 2003 GUP. Slightly more than half of all planned UGBS area was retained throughout all the plans (1953–2016 for the Lower Town and 1971–2016 for other neighbourhoods), with less in the Lower Town, Trnsko and Siget due to the 1986 GUP anomaly, and more in Savica and Jarun neighbourhoods where this anomaly was less emphasised. A portion of UGBS not retained in all the plans can be explained by the differences in spatial coverage of the same UGBS in different plans. This is especially expressed in Jarun, where the layout of the sports and recreation complex (lake and surrounding UGS) changed throughout the plans until it assumed the current shape in the 2003 GUP.

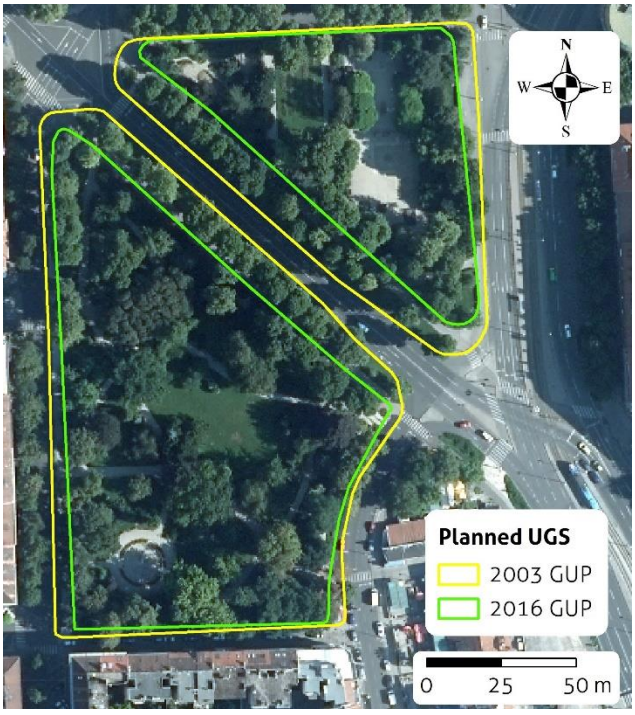

Fig. 3.4. Example of change in spatial coverage of UGS in the Lower Town between 2003 GUP and 2016 GUP.

Implemented UGBS

The planned UGBS areas in each plan were overlaid with the time-following aerial images to identify how much of the planned UGBS area was implemented (Table 3.5). Only the Lower Town was analysed in the first period (1953–1968) since the other neighbourhoods were not planned in the 1953 Plan. By 1968, 37.6% of the planned UGS area was not implemented, but 22.8% of provided UGS area was implemented irrespective of the plan, resulting in the implemented UGS area being 15.3% smaller than the planned area. By the end of the 1971/1986–2003 period, all neighbourhoods were completed except Vrbani. In this period, the implemented UGBS area was larger than planned (+8.9%) because 20.4% of the UGBS area was implemented irrespective of the plans. Slightly more than 13% of the planned UGBS area was not implemented. Note that the proportion of planned UGBS area was probably higher because it corresponds to combined coverage of two GUPs, where the 1986 GUP was somewhat anomalous.

The ratio of planned UGS and UBS areas was about 2:1, and in implementation, it increased to around 3:1, suggesting that planned UGS were more likely to be implemented from the planned UBS. The planned/implemented UGBS area ratio was close to even in the Lower Town, Jarun and Vrbani, while it was more prominent in Savica (1:1.4) and even more in Trnsko and Siget neighbourhoods (1:2.9), where for each planned square metre of UGS, almost 3 m^2 were implemented. More than 75% of the UGS area there was implemented irrespective of the plans. A small proportion of land (3.6%) in socialist neighbourhoods was left wild or neglected, predominantly in the south zone of Savica Neighbourhood (Fig. 3.5). Residents had cleared and converted a third of those wild and neglected lands into informal collective urban gardens by 2003.

Table 3.5. Overview of implemented UGBS in case study neighbourhoods between 1953 and 2016 in relation to the plans.

Case study neighbourhoods	**All neighbourhoods**			**Lower Town**			**Trnsko & Siget**		**Savica**		**Jarun & Vrbani**	
Studied interval	**1953–1968**	**1971/1986–2003**	**2003–2016**	**1953–1968**	**1971/1986–2003**	**2003–2016**	**1971/1986–2003**	**2003–2016**	**1971/1986–2003**	**2003–2016**	**1971/1986–2003**	**2003–2016**
total area of studied neighbourhoods (ha)	301.8	901.4	901.4	301.8	301.8	301.8	102.6	102.6	76.8	76.8	420.3	420.3
planned for UGS (%)	11.7	30.8	29.1	11.7	10.5	9.8	17.6	9.2	23.4	31.6	49.9	47.4
planned for UBS (%)	0.0	14.7	13.2	0.0	0.0	0.0	0.0	0.0	14.0	9.2	28.9	26.6
total area planned for UGBS (%)	**11.7**	**45.42**	**42.3**	**11.7**	**10.5**	**9.8**	**17.6**	**9.2**	**37.4**	**40.8**	**78.8**	**74.0**
implemented as UGS (%)	9.9	36.3	38.1	9.9	11.0	11.2	51.2	52.1	41.3	47.5	50.0	52.3
implemented as UBS (%)	0.0	13.1	13.1	0.0	0.0	0.0	0.0	0.0	9.3	9.3	26.4	26.5
total area implemented as UGBS (%)	**9.9**	**49.4**	**51.3**	**9.9**	**11.0**	**11.2**	**51.2**	**52.1**	**50.6**	**56.8**	**76.4**	**78.8**
planned UGBS not implemented (% of total planned UGBS)	*37.6*	*13.4*	*5.0*	*37.6*	*20.0*	*7.3*	*27.5*	*4.9*	*23.1*	*8.9*	*11.1*	*4.4*
UGBS implemented irrespective of plans (% of total implemented UGBS)	*22.8*	*20.4*	*21.2*	*22.8*	*23.9*	*21.7*	*75.2*	*83.1*	*42.6*	*31.4*	*8.4*	*9.8*
planned : implemented area ratio	**1:0.8**	**1:1.1**	**1:1.2**	**1:0.8**	**1:1.0**	**1:1.2**	**1:2.9**	**1:5.7**	**1:1.4**	**1:1.4**	**1:1.0**	**1:1.1**
area left wild or to neglect (%)	0.0	3.6	1.4	0.0	0.0	0.2	4.1	2.8	9.1	1.6	5.0	1.8
wild or neglected land used for collective urban gardening (%)	*0.0*	*1.2*	*0.6*	*0.0*	*0.0*	*0.0*	*3.1*	*1.9*	*0.4*	*1.6*	*1.7*	*0.6*

Fig. 3.5. Transformation of a mixed wild (including wetland and backwater lakes) and agricultural zone (in 1968) into a part of Savica Neighbourhood over the 1971/1986–2003 period.

Using the example of Trnsko and Siget in the 1971/1986–2003 interval, we can outline a collage of categories relating to planned and implemented UGS land uses (Fig. 3.6). The proportion of implemented UGS (dark green and light green) is visibly larger than of planned UGS (dark green and hatched). The 1971 GUP and 1986 GUP designated 11.5% and 14.6% of the two neighbourhoods' area as UGS, respectively, while the aerial image of 2003 shows that UGS covered 51.2% of the neighbourhoods. Areas coloured light green in Fig. 3.6 suggest that most of UGS realised irrespective of land-use plans correspond to the written provision operationalising the Corbusian greenspace matrix.

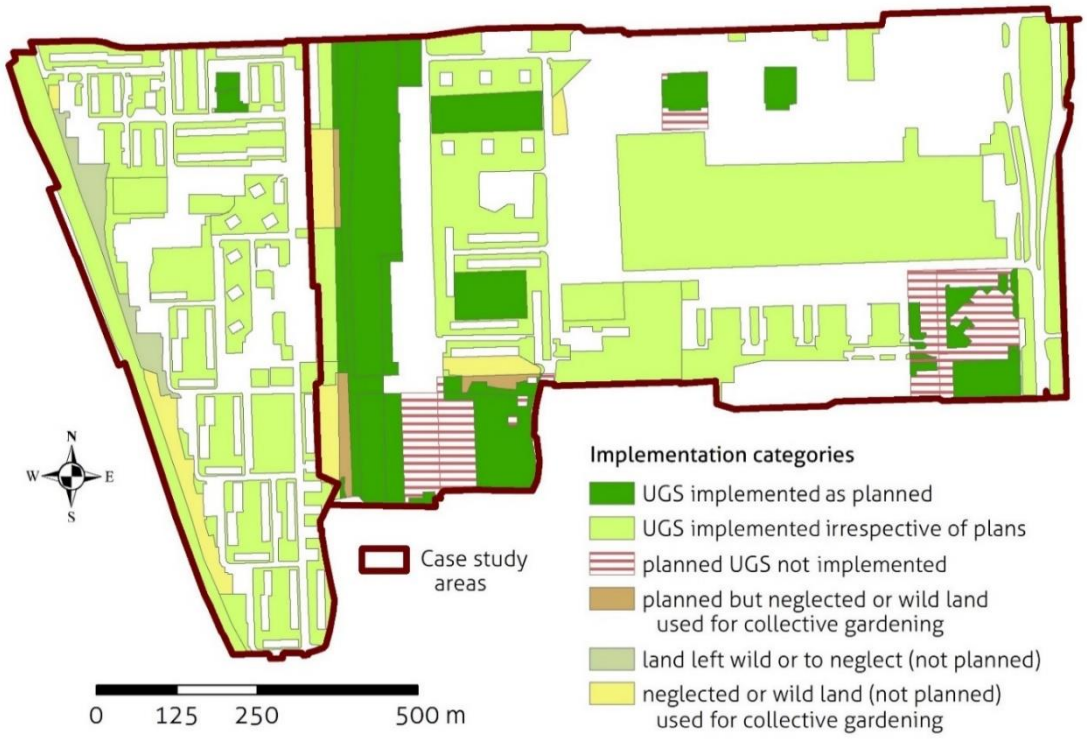

Fig. 3.6. Status of provided UGS in relation to general urban plans in the 1971/1981–2003 period in Trnsko and Siget neighbourhoods.

The 2003–2016 period was characterised by a further increase in the ratio of planned and implemented UGBS area (1:1.2), with 21.2% of UGBS area implemented irrespective of the plan and only 5.0% of planned UGBS area not implemented. This ratio grew in all neighbourhoods, with an immense increase to 1:5.7 in Trnsko and Siget. The increase was facilitated mainly by a reduction in the planned UGBS area in the 2003 GUP compared to the two socialist GUPs, especially in Trnsko and Siget neighbourhoods. The area left wild or to neglect more than halved since 2003 due to the introduction of maintenance and landscaping. The largest remediated zone was neglected land in Savica Neighbourhood, where the thicket was cleared and managed. The remaining area designated as a wild land was occupied by collective urban gardens, which were formalised and expanded in 2013 but did not become a planned land-use category. As collective gardens in Trnsko, Siget and Jarun neighbourhoods remained informal, their area declined.

In order to ensure better data comparability, we derived the same indicators for neighbourhoods that exclude large non-residential sections in Savica and Jarun neighbourhoods (Sava River, floodplain, and sports and recreation complexes). The reduced total studied area is 35.6% smaller than the total area (reduced 37.2% in Savica and 69.5% in Jarun). This data (Table 3.6) show that in the 1971/1986–2003 interval, the implemented UGBS area was still larger than the planned one (+8.6%) due to two-thirds of UGBS being implemented irrespective of the plans. However, almost half of the planned UGBS area was not implemented. The planned/implemented UGBS area ratio increased to 1:1.5 for the studied area due to a huge ratio in Savica Neighbourhood where for each planned square metre of UGS, over 11 m^2 were implemented. The ratio in Jarun Neighbourhoods was slightly smaller (1:0.9) than in the case of non-reduced area (1:1.0).

In the 2003–2016 interval, the ratio increased to 1:2.3 compared to the previous interval. Over 60% of UGBS were implemented irrespective of plans, while 17% of planned UGBS were not implemented. The ratios for both Savica and Jarun Neighbourhoods (1:4.8 and 1:2.0 respectively) were much larger than in the case of non-reduced areas (1:1.4 and 1:1.1, respectively). This suggests that the implementation of UGBS in non-residential sections followed the plans more closely than in residential sections.

Table 3.6. Change in planned UGBS in case study neighbourhoods between 1971 and 2016 excluding large non-residential sections (Sava River, floodplain and sports and recreation centres in Savica and Jarun neighbourhoods).

Case study neighbourhoods	**All neighbourhoods**		**Savica**		**Jarun & Vrbani**	
Studied interval	**1971/1986 –2003**	**2003– 2016**	**1971/1986 –2003**	**2003– 2016**	**1971/1986 –2003**	**2003– 2016**
(reduced) area of studied neighbourhoods (m^2)	580.7	580.7	48.2	48.2	128.1	128.1
planned for UGS (%)	14.8	10.8	3.3	7.8	26.9	15.4
planned for UBS (%)	0.0	0.0	0.0	0.0	0.0	0.0
total area planned for UGBS (%)	**14.8**	**10.8**	**3.3**	**7.8**	**26.9**	**15.4**
implemented as UGS (%)	22.7	24.8	36.2	37.1	22.6	30.3
implemented as UBS (%)	0.1	0.1	0.0	0.0	0.4	0.3
total area implemented as UGBS (%)	**22.8**	**24.9**	**36.2**	**37.1**	**23.0**	**30.6**
planned UGBS not implemented (% of total planned UGBS)	*48.3*	*17.5*	*2.9*	*8.7*	*87.4*	*40.2*
UGBS implemented irrespective of plans (% of total implemented UGBS)	*66.9*	*63.9*	*93.4*	*75.0*	*84.7*	*69.0*
planned : implemented area ratio	**1:1.5**	**1:2.3**	**1:11.1**	**1:4.8**	**1:0.9**	**1:2.0**
area left wild or to neglect (%)	3.3	1.9	1.8	0.0	11.1	5.9
wild or neglected land used for collective urban gardening (%)	*1.6*	*0.8*	*0.0*	*0.0*	*4.6*	*2.0*

Discussion

The analyses showed that: (a) most UGBS in Zagreb were planned and implemented in the socialist period, and (b) the implemented UGBS area differed from the planned UGBS area in both periods. In addition, the socialist authorities left some areas wild or neglected, which were increasingly developed in the post-socialist period.

Opposing approaches to UGBS planning

By far the largest provision of UGBS in Zagreb in the 1945–1990 period corresponds with Hirt's (2013) remark that European socialist planning systems provided abundant UGS. The proportion of UGBS rose from 10% (judged by the situation in the Lower Town in 1944) to 51% (in 2003). The situation in 2003 can be considered somewhat approximate for the end of the socialist period due to the low development level in the public space domain in the war-marked 1990s. Some instances of converting individual public spaces into building construction sites (Šimpraga, 2011) imply that the proportion of UGBS area at the end of the socialist period could only be slightly higher than we detected. The minimal increase (less than 1%) between 2003 and 2016 reflects post-socialist UGBS planning reported elsewhere. Similar trends were observed across post-socialist cities in Romania (Badiu et al., 2019), Bulgaria (Hirt, 2012), Slovakia (Kristiánová, 2016), Germany and Poland (Kabisch & Haase, 2013), some of which even experienced a decline in total UGBS area in the post-socialist period.

The reasons for such patterns in planning and provision of UGBS lie in interrelated historical and ideological circumstances. Following the socialist industrialisation after the Second World War, Zagreb experienced the most extensive spatial expansion, which declined significantly since the 1980s. The modernist approach that took off in the inter-war period well aligned with the technocratic perspective of socialist ideology (Hirt, 2005). Furthermore, the exceptional influence of Le Corbusier's works was reflected in the functionalist approach that dominated socialist urban planning by the late 1970s. In that light,

urban nature was attributed the function of creating a favourable living environment to stimulate the productivity of the working class (Vukić, 2007). In other words, urban nature was supposed to support urban hygiene (by aeration and smell and noise reduction), provide leisure and recreational opportunities for workers, and consequently support public health (by reducing health problems and sick leave) (Antolić, 1953; GUP, 1971).

The functionalist approach was materialised by planning and "mass-producing" neighbourhoods where greenspace would be the dominant land cover. Even though Le Corbusier was never referred to in plans, socialist neighbourhoods clearly resemble Le Corbusier's (1987) concept of "towers in the park" (first published in 1929), where buildings are nested in a greenspace matrix. This was exemplified in the 1953 Plan drafted by Le Corbusier's disciple Vladimir Antolić, which was never adopted because of the high estimated implementation costs of such extensive greenspace, among other reasons (M., 1954). However, later in the 1950s, ploughlands around Zagreb were nationalised and used for the development of new neighbourhoods 'from scratch', which allowed relatively inexpensive laying-out of greenspaces (Zlomislić, 2012). Indeed, Mirko Maretić, who planned Trnsko Neighbourhood, testified that they "followed Le Corbusier's principles to ensure as much aeration and greenery as possible." (Cvetnić & Klemenčić, 2008, p. 17). The 1971 GUP operationalised the Corbusian concept by a general provision asking that 60% of neighbourhood areas be greenspace. The difference between planned and implemented UGBS area by 2003 primarily shows the implementation of this provision, which was not present in land-use plan maps. Haase et al. (2018) and Badiu et al. (2019) found a comparable situation in Soviet cities and Bucharest, respectively.

Functionalist planning weakened in the 1970s and 1980s as the modernist approach succumbed to the post-modernist approach, and the economic situation worsened. This corresponded with a recorded shrinking gap between planned and implemented UGBS areas in Savica and Jarun neighbourhoods planned and constructed in the 1970s and 1980s. According to Dakić (1981), the detailed plans for new neighbourhoods were drafted through a consensus between the "old" and

"new" ideas even before the adoption of the 1986 GUP. This mainly resulted in denser construction at the expense of the Corbusian greenspace matrix, i.e. the reduced distance between buildings where Corbusian greenspace was typically located (Zlomislić, 2012). The 1986 GUP was already devoid of the functionalist approach and viewed public spaces (including UGS) as urban voids that could potentially be better utilised if filled with built objects (Gulin Zrnić & Vranić, 2015).

Such a view matched up with the post-socialist ideology based on private property, investments and initiatives. The production of new residential sections was largely transferred to private investors (Cavrić & Nedović–Budić, 2007) and the planning regulations were loosened to stimulate investments, which in practice often led to subduing public interest to private interest (Knežević, 2003). UGBS planned in the socialist plans were largely retained in the post-socialist plans while new ones were not anticipated. The Corbusian greenspace matrix was too expensive for private investors, regardless of possible social and environmental benefits, which is why UGBS in the new sections were planned with small and disconnected UGBS patches of questionable environmental functions. The post-socialist valuation of UGBS was indicatively reflected in the fact that no large UGBS (such as Jarun complex or city-level parks) were planned in Zagreb after 1990.

Jarun and Vrbani neighbourhoods provide an excellent arena for studying the succession from late-socialist to post-socialist planning. The new, multi-storey buildings in Jarun Neighbourhood were nested in the Corbusian greenspace matrix (Fig. 3.7-a); however, in contrast to Trnsko and Siget, the streets were not on a grid plan, possibly indicating the influence of post-modernism. Wooded Corbusian greenspaces of various shapes were equipped with paths, benches and children's playgrounds. During the construction of the Jarun sports and recreation complex, an area between the eastern part of the complex and the residential section became an urban void. Subsequently, the 1986 GUP re-designated it to housing land use. This section was planned in 1999 as an early post-socialist sub-neighbourhood (UDP Petrine–Županići, 1999) and constructed afterwards. The aerial image of the sub-neighbourhood (Fig. 3.7-b) reveals a simplification of the Corbusian concept. The proportion of UGS is visibly lower, and they consist of a

number of grassed patches too small to contain any equipment. Their function reads as purely aesthetical. Finally, Vrbani Neighbourhood was planned in 2005 and constructed afterwards (Mlinar, 2009). With slightly more UGS area (Fig. 3.7-c), Vrbani is more like the Petrine–Županići sub-neighbourhood than socialist Jarun. Grassed and regularly wooded patches were somewhat larger and contained equipment like benches and children's play areas. The eastern part of Vrbani Neighbourhood was planned as a sports and recreation facility. However, in contrast to housing buildings swiftly developed by private investors, the public-financed sports and recreation facility remained undeveloped more than a decade later.

Wild and neglected areas

In the 1971/1986–2003 interval, wild and neglected areas were detected in all socialist neighbourhoods. Those were mainly areas located on the margins of neighbourhoods (brown, yellow and grey in Fig. 3.6), which usually grew into a thicket and sometimes became informal waste dumps (Stojan & Čaldarović, 2006). Some of those were planned as UGS land use that was never implemented, while others were situated within planned residential sections, where the Corbusian greenspace matrix was never implemented (Crnetić et al., 2005). The occurrence of wild and neglected areas reflects flaws of the socialist planning system. Notwithstanding the proclaimed functional importance of UGBS, they were typically implemented in space only after other land uses (buildings and traffic). By that stage, funds had often almost run out, and any remaining funds were spent to develop UGBS closer to the neighbourhood centre, while UGBS on the margins were postponed (often indefinitely) (Nevjestić, 1976). Because of the economic crisis, in the 1980s even the implementation of more central UGBS, especially parks requiring landscape design, was sometimes postponed (e.g. planned parks in eastern and western parts of Jarun Neighbourhood).

Fig. 3.7. Evolution in planning residential sections: a) late socialist neighbourhood of Jarun, b) early post-socialist sub-neighbourhood of Petrine–Županići, c) mid-post-socialist Neighbourhood of Vrbani; all in a digital orthophoto from 2016.

Aerial images detected that some such spaces were used as collective urban gardens in 2003 and 2016. The increasing literature on that phenomenon reveals that collective gardening occurred in the 1970s when some residents started

clearing spots in the neglected thickets and arranging gardens, and over time, other residents would join them (Slavuj Borčić et al., 2016). We found that about one-third of wild and neglected areas in case study neighbourhoods were used for such collective gardening in 2003. In addition to one garden location in Savica, there were three in Jarun and six in Trnsko and Siget neighbourhoods. Lacking funds for land development, both socialist and post-socialist authorities tolerated these informal gardens. A contemporary observer, the ethnologist Dunja Rihtman–Auguštin (1988), called such grassroots initiatives to arrange and use land neglected by the authorities as "alternative urbanisation". Such initiatives were not limited to collective urban gardens—even the Corbusian greenspace matrix was often supplemented with usable contents such as benches, tables and boules courts built by residents themselves (Crnetić et al., 2005; Gulin Zrnić, 2009). Alternative urbanisation emerged as a bottom–up response to the socialist planning approach.

The reintroduction of private property in 1990 allowed the return of undeveloped nationalised land to legal inheritors upon request (Gulin Zrnić & Vranić, 2015). Some parts of the wild and neglected areas were re-privatised and developed over time, while others remained the city's property and usually remained neglected. While we cannot estimate the proportion of such areas before 1990 nor their loss before 2003 due to the unavailability of aerial images, our analysis showed that wild and neglected areas more than halved between 2003 and 2016. Subsequently, the number and area of collective gardens decreased because of increased interest in such land by private investors and the development of public functions by the city administration (Gulin Zrnić & Rubić, 2019). The area used for collective gardening increased only in Savica Neighbourhood. There, the gardens were formalised by the city administration in 2013, while the surrounding thicket was cleared and awaited landscaping into a park, although the whole area had been designated as a sports and recreation complex ever since the 1971 GUP.

Limitations

There are several limitations to this study that we were aware of when interpreting the results. First, as the studied period began around the mid-20th century, we used spatial data of limited accuracy. The aerial images set from 1944 and 1968 were black and white, due to which the identification of UGBS was somewhat susceptible to reading errors. We invested additional time to verify the readings to counteract this limitation but acknowledge that certain errors might have remained. In addition, the 1944 image set required substantial adjusting in terms of georeferencing due to the distortions on the images. Second, the 1953 Plan was made with an old technology where spatial precision could not be ensured. While we endeavoured to minimise the imprecision when georeferencing, some discrepancies remained and possibly affected area calculations for the Lower Town.

Third, we are aware that more accurate data on the implementation of planned UGBS would have been obtained if general urban plans were complemented with detailed urban plans made to navigate GUP implementation in individual urban sections (Tandarić et al., 2019). However, detailed plans were not drafted for all studied neighbourhoods, and many of the detailed plans drafted in the socialist period were not preserved. We hence decided not to use detailed plans in order to ensure data comparability. Fourth, changes in planning methodology resulted in different levels of UGBS being planned in different plans. The 1986 GUP was especially anomalous as it planned more levels of UGS in some neighbourhoods (Trnsko and Siget) and less in other neighbourhoods compared to 1971 and 2003 GUPs. In addition, the overlap of the two post-socialist GUPs with no reference years covered in aerial images induced some uncertainties in interpreting the realisation data. There are examples where a UGS is planned in 1971 GUP, but not in 1986 GUP, and it was implemented by 2003. The question arises whether the UGS was implemented following the 1971 GUP or irrespective of any plans.

Interpretation of urban planning's role in facilitating society's relationship with nature

The increase in the proportion of UGBS in the urban area from 10% to 50% over the socialist period reveals the power of urban planning to shape the urban landscape and regulate opportunities for human–nature interactions. Indeed, the spatial opportunities for such interactions not only multiplied but were distributed evenly across the urban space. Yet, distinct patterns in the UGBS provision in different periods indicate that these physical landscape configurations are an expression of the prevailing political ideology. Pre-socialist planning aimed to regulate the city in the way the then social elite wanted to see it. Central sections were planned to be reminiscent of other Central European cities with decorative parks (Slukan Altić, 2012), whereas there was no provision of UGBS in workers' neighbourhoods (Franković, 1973).

In the second half of the 20th century, urban planning was practised as a spatial aspect of planning the classless socialist society (Franković, 1985). All the neighbourhoods were standardised in an attempt to ensure equal living conditions for all citizens. Urban nature was recognised as means to that endeavour while at the same time it could sustain high working productivity. Socialist ideologists and planners recognised and utilised broader nature's contributions to individuals (workers) and society than the pre-socialist ones. This increased opportunities for human–nature interactions. Such planned psychosocial attributes of UGBS were recognised across the socialist cities (Badiu et al., 2019; Dushkova et al., 2016).

After 1990, urban planning was once again adjusted to the capitalist ideology—the regulatory role of the planning was reduced to allow greater liberties in private investments in space (Cavrić & Nedović–Budić, 2007). This led to the prioritisation of commercial land uses over public spaces, and UGBS were provided only in remnant patches between built spaces, often with a predominant decorative function that would increase the commercial value of housing. Overly small and simple in terms of vegetation and park equipment, those patches could hardly evoke the impression of nature. This reduction in the quality and net loss of greenspace overall led to reduced opportunities for meaningful interaction with

nature, which is in line with the trend of diminishing contact with nature across the Western world (Miller, 2005; Soga & Gaston, 2016). Contemporary citizens of Zagreb can interact with nature predominantly thanks to the fact that most of Zagreb is the legacy of the socialist planning approach.

Urban plans are one of the fundamental tools for mapping the socio-political ideology onto space. Rather than revealing society's present relationship with nature, they represent the aspirations of the ruling ideology. Combining urban plans with aerial imagery enables comparison between official plans and the situations on the ground. Our study found a number of collective gardens established through grassroots initiatives, which were never adopted by official socialist policy despite providing opportunities and satisfying the need for interactions with nature (Slavuj Borčić et al., 2016). Further research is needed to establish whether and to what extent the provided opportunities for human–nature interactions in terms of official forms of UGBS were seized by citizens and whether it influenced behaviour in the long run. After all, "people do not use city open space just because it is there and because city planners or designers wish they would" (Jacobs, 1961, p. 90).

Studies have established that the high availability of UGBS does not necessarily lead to more meaningful human–nature interactions (Lin et al., 2014). Nevertheless, if sufficient opportunities are not provided, society's relationship with nature cannot be expected to flourish. Today, we are more and more aware of the contributions through which nature supports society and human wellbeing and the negative consequences of the diminishing contact with nature. These concerns increasingly enter the policy discourse, become parts of contemporary ideologies and are reflected in planning documents (via green infrastructure projects, collective urban gardens, etc.) (Beery et al., 2017; Fox–Kämper et al., 2018).

The end of PAPER III.

4. Collective urban gardens in socialist and post-socialist Zagreb (c. 1950–2021)

Vacant land was kind of parcelled and demarcations created an urban aesthetic of waste—old doors, slats, blinds, wire mesh for beds, clothes dryers, ribbons—all that demarcates individual garden empires.

Valentina Gulin Zrnić (2009, p. 131),
anthropologist and ethnologist in Zagreb

This chapter is written as a research article, and it is currently being prepared for submission to *Landscapes*.

The manuscript supplements Chapter 3 by providing a perspective of unplanned UGBS that occurred in comprehensively planned socialist neighbourhoods via residents' unilateral initiative and actions. This chapter investigates how collective urban gardens originated and developed alongside planned UGBS and how urban planning enabled and facilitated their development over time. Considering wild collective urban gardens expands the immediate context in which UGBS were formally supplied, shedding novel light onto urban planning's role and success in providing opportunities for meaningful contact with nature. The chapter also juxtaposes official stances towards collective gardens and threats to their survival in the two periods.

PAPER IV

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Status of the paper: **in preparation**

Abstract

Various forms of collective urban gardens developed in the socialist cities of Southeast Europe after 1945. We use field evidence and qualitative research to unravel the origins, development and use of collective urban gardens in Zagreb, Croatia. We interviewed gardeners together with relevant stakeholders: planners, academics and activists. We also analysed academic and professional papers, newspaper articles, and legal acts. We identify two main types of collective gardens, which are hybrids of common typologies of allotments and community gardens in western cities. The 'unplanned garden' originated in the 1970s and 1980s on neglected spaces in urban neighbourhoods. These were often threatened by private development following the post-socialist transition after 1991. In 2013, Zagreb council initiated the City Gardens project, which created new allotment gardens for younger environmentally-oriented people. However, the future of both types of collective gardens remains uncertain because they are still not an official planning category.

Keywords: collective urban gardens, city gardens, hybrid gardens, post-socialist city, unplanned collective gardens

Introduction

The social and cultural importance of urban gardens in Europe has long been recognised (Bell et al., 2016; Crouch & Ward, 1988). We distinguish between individual, private urban gardens, usually adjoining houses, and for the personal use of its residents, and collective urban gardens used by people whose accommodation is not in the immediate vicinity. This study addresses the latter, following the notion of 'collectively managed urban gardens' (Dennis & James, 2017). There are two main forms of collective urban gardens: allotment gardens and community gardens. These differ in origins, character and users, although the distinction between them is not always clear, and there are hybrid forms. Allotment gardens date back to the 19th century, when they were cultivated to provide household food (Bell, 2016). The International Office of Allotment and Family Gardens outlines allotment gardens as (1) managed by local authorities, private or public bodies or by an association, (2) usually consisting of regular plots (allotments) that are rented to individuals or families for the non-commercial cultivation of fruit, vegetables and ornamental plants and recreational purposes (Bell, 2016).

Community gardens often originate on vacant land obtained informally by ad hoc means where a community of gardeners share space, cultivation practices and management activities, although there may be some individual plots (Bell, 2016). The users of community gardens tend to be young, politically active and environmentally aware citizens (Douglas, 2014). Unlike allotments, the focus is explicitly on community building, social exchange, and recreation rather than food production (Škamlová et al., 2020). They encourage interactions with plants which may help to counteract urban disconnection from nature and disregard for its protection (Artmann et al., 2021; McEwan et al., 2020; Soga & Gaston, 2016).

Studies of collective gardens are often limited to western countries (Guitart et al., 2012). The few studies of collective urban gardens in post-socialist cities indicate that gardening there has different origins, causes and organisations from those in western countries (Čepić et al., 2020; Gulin Zrnić, 2009; Škamlová et al., 2020). For instance, while collective urban gardens in western countries started

appearing in the 19th century to assist food production (Glavan et al., 2018; Tappert et al., 2018), in Southeast European countries, they appeared much later (Škamlová et al., 2020) and were connected with the way of life that rural incomers brought to the city (Slavuj Borčić et al., 2016). There is also diversity within Eastern Bloc countries. In some, allotment gardens were planned and supported institutionally during the 1950s for food provision and enhancing the productivity of the working class (Čepić et al., 2020), in others they have become fashionable more recently among young city dwellers (Haase et al., 2018).

Unplanned collective urban gardens in Yugoslavia that originated in the 1970s were not officially recognised, yet authorities tolerated them (Djokić et al., 2018; Gulin Zrnić & Rubić, 2019). They are often termed *divlji vrtovi* in Croatian, meaning 'wild gardens' because they originated spontaneously (Biti & Blagaić Bergman, 2014; Gulin Zrnić & Rubić, 2018; Slavuj Borčić et al., 2015). In some post-socialist countries, such as Slovakia, gardeners were forced to purchase their garden plots after the adoption of private property if they wanted to continue cultivating them (Čepić et al., 2020). In Croatia, they remained informal and became threatened by market-economy-led projects (Butorac & Šimleša, 2007). The early 2010s saw increasing pressure for the establishment of community gardens across European post-socialist countries (Čepić et al., 2020; Mrakužić, 2018; Škamlová et al., 2020).

By focusing on the rich socialist and post-socialist collective gardening history in Zagreb, Croatia, this paper explores the specific role of collective urban gardens in forming and maintaining human–nature connections in socialist and post-socialist cities. It considers how collective urban gardens in Zagreb differ from the common typology of allotment and community gardens. It goes on to explore how socialist and post-socialist ideologies influenced the development of collective urban gardens. Finally, it examines how collective urban gardens coexist within changing urban spaces and what is their likely future in post-socialist Zagreb.

Historical and ideological context

Zagreb's population more than tripled from 32,200 inhabitants in 1857 to 109,000 in 1910 (DZS, 2005). Consequently, there was growth in market gardens around the city. Much produce was sold by market women known as *kumice* and after the First World War, many Bulgarian immigrants specialised in market gardening (Glasnova, 2014). Their garden plots, with associated sheds for tools and shade, are identified as harbingers of Zagreb's urban gardens (Gulin Zrnić, 2012). World War II transformed Zagreb's social, economic, and political life. The post-war socialist government promoted rapid industrialisation (Glamuzina & Fuerst–Bjeliš, 2015). Zagreb attracted incomers from rural areas across Yugoslavia and the population grew substantially (325,000 inhabitants in 1948, 580,000 in 1971, 707,000 in 1991 (DZS, 2005)). Most urban land was nationalised and taken over by the city authorities for development and management (Tandarić et al., 2019). Nationalisation of farmland around the city meant that planners could largely ignore property issues and plan new neighbourhoods from scratch (Stojan & Čaldarović, 2006).

The socialist emphasis on the collective rather than individuals meant planning attempted to provide spaces and services primarily for working people (Vukić, 2007). The post-war planners were strongly influenced by Le Corbusier's ideas and neighbourhoods had abundant green spaces seen as essential for public health and recreation (Antolić, 1953; GUP, 1971). But the financial situation meant ambitious plans were not always implemented and housing construction was prioritised over managed green spaces (Premužić, 1962). Open land was frequently set aside for future parks, which were seldom completed by the end of the socialist period in 1991. Many such areas were unmaintained and became overgrown with shrubs. They provided unofficial children's playgrounds, and from the 1970s, people living nearby would clear a few square metres for gardens (Slavuj Borčić et al., 2016).

The 1980s saw several economic crises in Yugoslavia and the situation deteriorated dramatically with the violent disintegration of Yugoslavia (Benson, 2004). The introduction of a free market and private property in 1991 brought

the individual back to the centre, but privatisation of national assets was in some instances corrupt (Blau & Rupnik, 2007). Some undeveloped public urban spaces were claimed by the descendants of landowners affected by socialist land nationalisation. In addition, some private developers became influential enough to amend land-use plans and build on city-owned plots designated for schools or parks (Gulin Zrnić & Vranić, 2015; Šimpraga, 2011). This threatened established green spaces, including unplanned urban gardens. Private investors became very powerful and had a strong influence on local politicians leading to deregulations of urban planning (Cavrić & Nedović–Budić, 2007).

The 1990s were politically turbulent in Zagreb because voters' preferences were not in line with the ruling party at the national level. The city authorities encouraged private investors' projects, often destroying public open spaces (Svirčić Gotovac, 2010). Little changed after 2000 when Milan Bandić became mayor. He remained in post until his death in 2021 and his populist rule was associated with strong connections with private investors and developers. Various citizen associations were established to oppose projects which damaged public open spaces (Svirčić Gotovac & Zlatar Gamberožić, 2020). Several of these activist groups combined to form an anti-Bandić Green–Left Coalition in 2017 and they won the city elections in 2021.

Methods

Study area

Four case study neighbourhoods were selected based on (i) presence of collective urban gardens, (ii) difference in the period of neighbourhood construction, and (iii) difference in the origins and management of collective urban gardens (Fig. 4.1). Trnsko and Siget originated in the 1960s and 1970s in the area known as Novi Zagreb, a 'model' socialist city (Korov, 2012); there are five places with unplanned collective urban gardens. Savica Neighbourhood was mainly built in the 1970s and '80s, and there is one area with unplanned collective urban gardens which later became formalised. Jarun Neighbourhood,

which originated in the 1980s with new housing added later, has three locations with unplanned collective gardens.

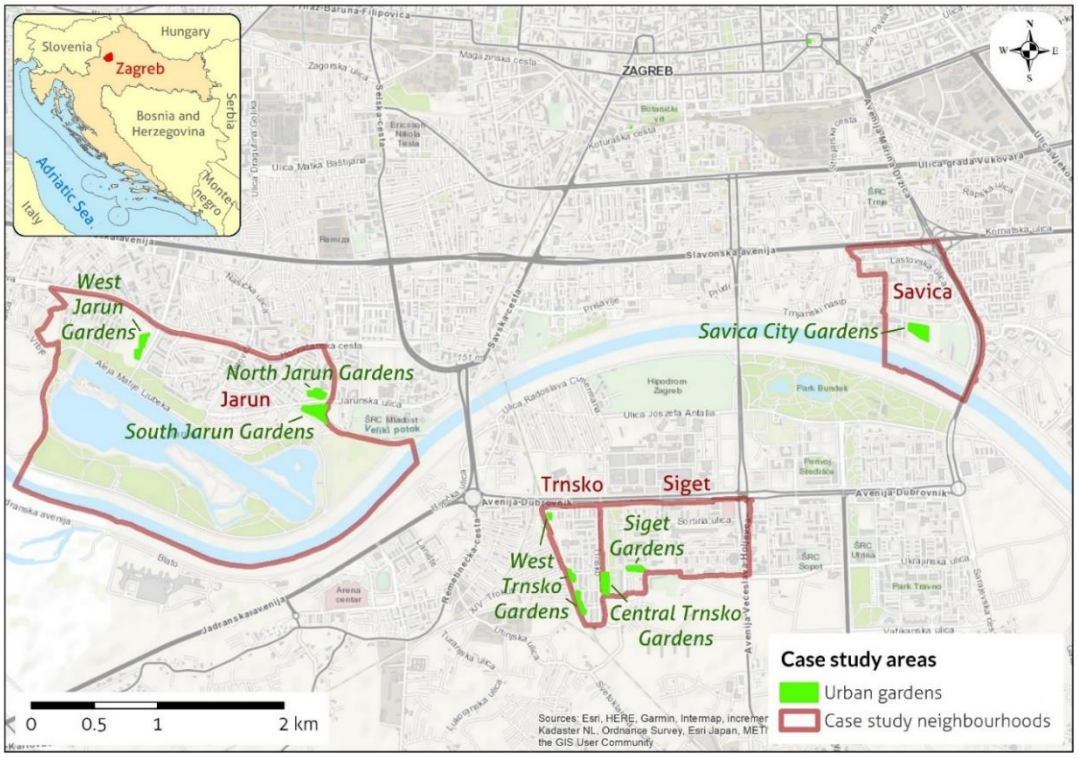

Fig. 4.1. Spatial distribution of case study neighbourhoods and urban gardens.

Data collection and processing

Thirty-seven semi-structured qualitative interviews were carried out between July 2019 and January 2020 with individuals from four stakeholder cohorts: users of collective urban gardens (hereafter: gardeners), activists for formal collective urban gardens and park protection (activists), urban planners and decision-makers (planners), academics from various disciplines (academics). We interviewed 10 gardeners (Savica 4; Trnsko and Siget 3; Jarun 3). Several gardeners we approached in unplanned gardens were unwilling to participate because of distrust with the city authorities. Most of those interviewed were retired, which corresponds with other research (Slavuj Borčić et al., 2016). Activists (9) were identified through analysis of media resources. Academics (8)

with interests in urban planning and greenspace studies in Zagreb were identified in the relevant literature and sampled to achieve disciplinary diversity. Planners (10) were identified in relevant literature and planning documents to reflect experience in different regimes and planning roles. The topics covered in the interviews included origins, development, structure, use, and the future of collective urban gardens in Zagreb. Interview protocols were structured and administered in a way to enable extending the discussion on specific topics of interest.

In addition to the interview data, written records about collective urban gardens in socialist and post-socialist Zagreb were collated. We searched CROSBI – Croatian Scientific Bibliography portal (www.bib.irb.hr) on 21 December 2020 for exact terms: 'urban garden*', 'allotment garden*', 'community garden*', 'city garden*' and 'wild garden*' as well as their counterparts in the Croatian language: 'urbani vrt*', 'zajednički vrt*', 'gradski vrt*', 'društveni vrt*' and 'divlji vrt*'. In total, we collected and analysed 26 papers, two books, two newspaper article, two legal acts, one study made by the city administration, and one project proposal made by an activist group (the full list is available on the link). Scholarly and public interest in collective urban gardens in Zagreb, and Croatia in general, only proliferated after the removal of unplanned collective gardens in Travno Neighbourhood in 2012. Urban gardening was often regarded as a trivial and marginal practice in the socialist era (Gulin Zrnić & Rubić, 2018). This lack of evidence emphasises the importance of oral histories collected from gardeners themselves. The interviews were audio-recorded and transcribed verbatim in Croatian. The analysis was conducted in Croatian to avoid loss of meanings and subtlety in translation into English. Transcribed interviews and written records were then organised and coded using NVivo 12.

Results

Origin and development of unplanned urban gardens

The beginnings of collective urban gardens can be traced back to the increased influx of rural population during Zagreb's rapid industrialisation in the 1970s and the construction of new socialist neighbourhoods (Slavuj Borčić et al., 2016). Gardens were created on vacant land plots that were either planned for future development (usually parks) but not realised, or were left as green strips at the neighbourhood borders. The lack of obvious use and resulting neglect were incomprehensible to rural incomers who were used to gardening. They often started planting vegetables, fruits and ornamental plants in such spaces (Slavuj Borčić et al., 2016).

Several interviewees confirmed that early gardens arose spontaneously during the 1970s and 1980s. One gardener (64/F) from Trnsko, who inherited a plot from her father, estimated that he had worked it thirty years ago, which corresponds with the last years of the socialist period. She noted that the Central Trnsko Gardens originated on land left for a road that was never built. No information on the origin of Siget Gardens could be found in literature or from interviewees. Stojan and Čaldarović (2006) revealed that the unplanned West Trnsko Gardens along the railway originated in the 1980s, twenty years after the neighbourhood was established.

Gardens in Jarun were established immediately after the first phase of its construction in the mid-1980s: two gardeners said that they had tended their plots for 33 years. This fits in with Biti and Blagaić's (2012) finding that informal gardening began just before the Universiade (an international sports event) held there in 1987. Despite being constructed in the 1970s and early 1980s, gardens in Savica originated only in the early post-socialist period. According to one gardener (69/M), "*It's been around 20 years now since the first people created gardens in this briar patch*", but ten years had to pass before gardening became widespread. Respondents from both neighbourhoods confirmed that unplanned gardens originated on derelict land overgrown with brambles and shrubs. One or

two people would start clearing the thicket for gardens and others would gradually join them. A gardener from Savica (70/F) noted: "*people started coming, they watched us, and whoever was interested occupied a part of the land and established a garden.*" This was not a simple business. One gardener from Savica (69/F) recalled that "*When you started working the garden, if you wanted to reach the soil, you had to extract a lot of stones*" because loads of "*construction waste had been dumped there*".

Most unplanned gardens originated on neglected state- or city-owned land (Gulin Zrnić, 2012) and some undeveloped land plots were returned to their legal inheritors after 1991 (Gulin Zrnić & Vranić, 2015). According to a planner (53/F) directly involved in the city's dealing with gardens, some gardens are located on the city-owned land, but "*there are also 'wild' gardens that usurped private property. The landowners do not complain so people use them while they can.*" Two gardeners in North Jarun Gardens assumed the city had owned the land after the socialist authorities appropriated it. A gardener from Savica (69/M) who began gardening in 2010 said that soon after he and his neighbour cleared a plot they found "*it to be a private plot*". As they could not obtain the right from landowners to keep using the land, they had to move. Fortunately, a similar area nearby was city-owned land and it was here that Savica Gardens originated. In general, wherever the city remained the landowner after 1991, gardeners were not expelled unless the land was actually developed according to plans, which rarely happened.

Food production and food security were rarely the only motivations for establishing unplanned gardens (Slavuj Borčić et al., 2016). Stojan and Čaldarović (2006) documented the case of a neglected green strip along the railway (West Trnsko) which residents used, by the 1980s, to dispose of bulky waste. However, by 1990 the shrubs and waste has been cleared by a group of residents who established gardens there. Stojan and Čaldarović (2006) argued that residents' rural habits and wishes to utilise space and beautify the environment were the main reasons for their endeavour. The city authorities tended to turn a blind eye towards these gardens. A retired planner (79/F) noted they were "*silent and*

tolerated it, no one prosecuted gardeners" because, as another planner (59/F) explained, the deteriorating economic situation meant that the grey economy was condoned to "*appease citizens on the verge of poverty*". Even during the 1987 Universiade, the authorities did not clear the gardens but asked gardeners to remove ugly fences and plant only low growing crops (Gulin Zrnić, 2009, 2012). Socialist gardeners were often unaware of plans for the land they occupied, but the ever-worsening economic situation virtually ensured that plans were not realised, and unplanned gardens mostly remained intact.

Origin and development of city gardens after 1991

The deregulation of planning, re-introduction of private investments and consumerist lifestyle after 1991 transformed neglected public spaces into potential economic resources, threatening the survival of unplanned gardens (Gulin Zrnić & Rubić, 2019). Some gardens situated on the land returned to private ownership were removed, but some still exist. On the other hand, some gardens on city-owned land were permitted to remain if gardeners officially leased the land. One gardener (60+/F) recalled that city surveyors came to map part of the South Jarun Gardens, and afterwards, users leased the plots. Gardeners in Central Trnsko Gardens told a similar story. Although the land beneath North Jarun Gardens is also city-owned, the authorities never regulated the gardens and gardeners claimed never to have been contacted by the city administration.

On some other city-owned lands, unplanned gardens were removed for development. There was little public concern about this until 2012, when the city authorities ordered the destruction of unplanned gardens at Travno in Novi Zagreb to make a park that had been planned there for decades. Although the gardeners tried to defend their gardens, some residents welcomed the construction of the park (Balija, 2012). The gardens were removed in spring 2012, retaining only trees usable for landscaping the park (Fig. 4.2), although the park remains unlandscaped to this day. However, the event was a *cause célèbre* which echoed among citizens and activists who established an initiative called

Parkticipacija, which advocated legal, planned collective gardens that would prevent expropriation of such gardens. An activist (43/M) argued that the proposed 'social' gardens "*were not intended only for gardeners, but in each of them we proposed arranging a children's playground*" and they were supposed to be "*open for the local community*." Another activist (37/F) thought the idea "*was that people meet there, hang out*" and "*maybe establish some kind of exchange of seeds, vegetables and ideas*". Two city planners (45/F and 53/F) insisted that the idea of such collective urban gardens was already being discussed when Parkticipacija submitted their proposal (2012) to them.

Fig. 4.2. Removal of the unplanned collective gardens in Travno Neighbourhood in the spring of 2012.

Source: Balija (2012).

Despite discussions between Parkticipacija and the city administration, in early 2013 the mayor published *Conclusion on Conducting the Project "City Gardens"* (*Zaključak o Provođenju Projekta „Gradski Vrtovi"*, 2013), which did not

mention Parkticipacija. The authorities committed to establishing allotments on city-owned land in different districts. Plots would be advertised and let free of charge on a two-year contract. Several interviewees doubted that city gardens would have been established if Parkticipacija's endeavour had not coincided with the 2013 mayoral election campaign. One ethnologist (50/F) said "*the mayor anticipated gains of establishing city gardens for his populist approach, he reworked it in his own way and kicked out Parkticipacija from the story.*" Whatever its origins, the 2013 city gardens plan helped to halt a general decline in collective gardens in Zagreb. According to a planner (53/F) involved in the project, five city gardens were established in 2013 (9 ha), which increased to thirteen gardens by 2019 (23 ha in total).

There were some problems. One gardener from Savica (69/M) recalled that in 2013 the authorities "*wanted our gardens here removed and that we all had to go*" to the new city gardens in nearby Borovje Neighbourhood. He continued that "*Then we all stood up against it*". An activist (37/F) explained that a meeting with the authorities was scheduled on which "*the majority of gardeners were Homeland War veterans*", an influential social group. She recalled that after the meeting, "*the story about removal simply disappeared*". The mayor decided to keep the unplanned garden plots, incorporate them in the project and expand with additional plots (Fig. 4.3). The 'wild' gardeners were to retain their plots but had to follow the formal procedure of obtaining the right to use a plot. As a symbol of the mayor's pact with gardeners, he reserved a plot in Savica City Gardens for himself. Ever since, local people have referred to the city gardens as 'Bandić's gardens' named after the mayor.

Fig. 4.3. Savica City Gardens (taken on 12/07/2019 by N. Tandarić).

Use of collective urban gardens

We identified several differences between unplanned and city gardens related to user characteristics, plot transfers among users, investments, plot boundaries, and socialising. Socialist gardeners tended to be labourers who had moved from rural areas to blocks of flats who used gardens to reconnect with their countryside traditions (Slavuj Borčić et al., 2016). Gardeners from Trnsko confirmed that they had all 'inherited' gardens from their elderly relations or neighbours, whereas gardeners from Savica and Jarun were all the creators of their garden plots. Today both 'wild' and land-renting gardeners (who used to be 'wild' gardeners in the socialist and early post-socialist period) are mostly pensioners. In contrast, the city gardeners tend to be younger people with no close ties to the countryside and no previous gardening experience (Slavuj Borčić et al., 2016). The situation is rather different in Savica Gardens, where unplanned gardens were formalised, and the new gardeners joined the old ones. One old gardener (69/F) said that "*The youngest gardener is 40. All others are beyond 40.*" Another (70/F) continued, "*Some of our fellow gardeners have died from old age.*"

Transfers of unplanned garden plots from person to person are usually through informal acquaintance via oral permissions (Biti & Blagaić Bergman, 2014). If no one is found, plots are abandoned (Slavuj Borčić et al., 2016).

Fieldwork evidence (2019) showed that this is happening in Central Trnsko Gardens; the abandonment "*began last year and continued this year*" (gardener 72/F). An activist (41/M) from Siget reported "*people mainly get drunk in that overgrown area*". The feeling of abandonment and uncertainty encouraged some gardeners to move to West Trnsko Gardens, where the situation was more hopeful (64/F). In contrast, city gardens have a formal legal procedure for allocating plots and selection criteria (location and length of residence, income level, belonging to vulnerable groups and special social statuses, number of household members) (*Zaključak o Provođenju Projekta „Gradski Vrtovi"*, 2013).

Gardeners of unplanned plots tend to utilise whatever materials they have to hand when making fences and sheds. Boundaries are frequently hedged with shrubs reinforced by old bed frames, window shutters or sheets of corrugated iron (which Gulin Zrnić (2009) calls *urban aesthetics of waste*) (Fig. 4.4-a). Over time, hedgerows have replaced such fences in many gardens, forming a thick barrier between gardens plots, and around the edge of the collective gardens (Fig. 4.4-b). In contrast, city gardens were enclosed by transparent wire fences (Fig. 4.3).

Fig. 4.4. Fences of unplanned gardens: a) improvised fence in South Jarun Gardens (taken on 25/06/2021 by N. Tandarić); b) hedgerows in North Jarun Gardens (taken on 15/04/2019 by N. Tandarić).

Unplanned plots vary from small ones of a few square metres to large ones of hundreds of square metres. They usually include various shacks, improvised gazebos, barbecues, shrubs and fruit trees (Fig. 4.5). Such freedom and diversity is absent in city gardens where all garden plots are the same size (50 m^2), the land is prepared for the cultivation of annual plants, and all gardens are equipped with water supply, tools and sheds. 'Wild' gardeners often worked together to remove building rubble and install a common water pump as illustrated by a gardener from Trnsko (64/F): "*We share a pump that we installed and paid for together.*" (Fig. 4.6).

Fig. 4.5. A shack in an unplanned plot in Central Trnsko Gardens (taken on 23/06/2021 by N. Tandarić).

Fig. 4.6. A common water pump in the corridor of North Jarun Gardens (photo taken on 13/07/2019 by N. Tandarić).

Many gardeners of unplanned plots produce food without using chemicals but they are allowed to use pesticides. In contrast, city gardeners are not permitted to do so, indeed organic cultivation and ecological, recreational, health and sustainability goals are at the heart of the City Gardens project (Mrakužić, 2018). As such, city gardens attract young and environmentally aware people compared to predominantly old 'wild' gardeners with a rural background (Slavuj Borčić et al., 2015). As few of the new gardeners had gardening experience, the City Office for Agriculture and Forestry created a *Gardening Manual* with practical advice on organic farming principles (Slavuj Borčić et al., 2015).

Finally, both unplanned and city gardens facilitate socialising, yet in different forms. 'Wild' gardeners felt that they created firm social bonds through collective efforts in garden creation. These unplanned gardens normally have no common socialising areas, but gardeners meet and socialise in individual gardens in shacks, gazebos or under canopies. Although 'social' gardens proposed by Parkticipacija were not introduced, one planner confirmed (54/M) that all city gardens have a common area for socialising, rest, training and workshops (Fig. 4.7). However, old gardeners from Savica still prefer to socialise in their individual gardens and a gardener activist (45/F) noted that there was social

bonding in the creation of gardens in Prečko Neighbourhood, which never happened in city gardens.

Fig. 4.7. The common area of Savica City Gardens (taken on 12/07/2019 by N. Tandarić).

Future of collective urban gardens

The future of both unplanned collective gardens and city gardens in Zagreb is uncertain. A city planner (45/F) noted that unplanned gardens are usually on land that is not city-owned but either private, state-owned or with mixed public–private ownership. This has protected them from development so far, but the sites may be developed in the future. At Trnsko, where gardens are on the route of a planned road, people have been gardening with the fear of eviction for decades. A gardener (64/F) recalled that when the mayor visited the gardens, he "*said that the road will eventually be built because several houses are not easily accessible, there's no road. Now, when will that happen, no one knows.*" The mayor went on: "*Let the people work. Until the road is built there's nothing to complain about – clear it up, there goes a road, end of story.*"

'Wild' gardeners in South and West Jarun Gardens were fully aware of the uncertainty and hoped that they would receive at least a month's notice (Biti &

Blagaić Bergman, 2014). In the western part of South Jarun Garden, a gardener (60+/F) said the authorities "*had once already cleared everything, including gardens, because a sanatorium was supposed to be built there.*" Another gardener (66/F) said: "*I can't remember how many times they 'cut a ribbon' for the sanatorium. But so far, nothing.*" As the sanatorium was not built, the location turned into a thicket. The gardener (60+/F) thought the existing unplanned gardens to the east would be similarly overgrown if it were not for the work of the gardeners. She thought that the gardeners should be given '*compensation for maintaining, working and clearing it instead of charging them*" for leasing the plots. Such uncertainties made gardeners in Jarun suspicious and unwelcoming to any "intruder". Some gardeners even thought that the interviewer worked for the mayor and was trying to find a way to take away their gardens. A Parkticipacija activist (37/F) remembered that these gardeners were '*sceptical and reluctant to talk to people.*" Biti and Blagaić Bergman (2014) documented a similar experience there in 2012.

The future of individual city gardens is also uncertain. All gardeners sign a two-year contract for their plots, even those in Savica Gardens who tended their plots for many years before they were formalised. A planner (45/F) stated that the contract could not be longer "*because that's not planned land use. City gardens are a temporary land use for city-owned land until it's brought to the planned purpose.*" According to an academic geographer (37/F), "*the authorities obviously reserve the option to convert the land into something else in the future.*" As part of the initiative for formal urban gardens in the early 2010s, an activist (43/F) reported that Parkticipacija proposed that a designation for gardens should be introduced in urban plans, but the authorities did not adopt it. Nonetheless, even if individual gardens are developed, public interest is such that new plots will have to be established.

Discussion and conclusions

The origins of Zagreb's unplanned collective gardens lie in the socialist period when individuals and small groups of gardening residents, often from rural backgrounds, cleared abandoned sites and cultivated them on their own initiative (Slavuj Borčić et al., 2015). Residents effectively engaged in what is now termed *guerrilla gardening*, which Reynolds (2008) defines as gardening without permission on someone else's (usually municipal) property. Guerrilla gardening objectives include essential food production, landscape improvement and political action (Mikadze, 2020). Whereas improving the landscape was recognised in West Trnsko Gardens (Stojan & Čaldarović, 2006), we argue that unplanned gardens also had a latent political dimension as a form of resistance to political control over space. Socialist authorities planned and developed public space and housing, leaving residents as mere users of that space with little sense of personal control.

By fencing their unplanned garden plots, gardeners created a sense of privacy in a space legally treated as urban commons (Tandarić et al., 2019). In a way, these plots represented gardeners' "private worlds" free from interference by Zagreb authorities (Slavuj Borčić et al., 2016). This can also be seen as appropriation of public space (Mierzejewska, 2011), but as the gardeners cleared up rubbish and waste, the city authorities indeed did not interfere with them or regulate them in any way. They were a tacitly accepted anomaly within the urban planning system. This was very different in some socialist countries: Czechoslovakia regulated collective gardens by law in 1975 and Poland in 1981 (Bellows, 2004; Tóth et al., 2018).

After 1991 the former informal socialist tolerance of gardens grew into careless disregard. Unplanned gardens were not removed so long as private owners did not claim the underlying land plots. Moreover, as property rights became complicated, many lands remained neglected and even new wild gardens were formed on some of them (e.g. Savica Gardens). The city's land-lease programme legitimised some unplanned gardens, but many gardeners had developed strong place connections over time and feared takeover by the legal

owner (usually the city or state). The city gardens project introduced significant change in the official treatment of collective gardens through its introduction of leases (*Zaključak o Provođenju Projekta „Gradski Vrtovi"*, 2013). The project is socially sensitive and takes family income and welfare status into account when allocating plots. But there is no local or national legislation regulating collective garden allocation, use and maintenance, as in some other post-socialist countries such as Germany, Poland or Slovakia (Fox–Kämper et al., 2018; Klepacki & Kujawska, 2018; Tóth et al., 2018). The city gardens project has increased both the number and popularity of collective gardens.

Socialist neighbourhoods had large residential blocks set in a matrix of Corbusian grassland and trees (Cvetnić & Klemenčić, 2008). Areas on the edge of neighbourhoods tended to be neglected and attractive to 'wild' gardeners who established unplanned collective gardens. When located close to tall buildings, they provide a strong contrast to the dominant socialist paradigm of a city for working men (J. C. Fisher, 1962; Slavuj Borčić et al., 2016). A striking example is Central Trnsko Gardens in front of one of Zagreb's largest buildings (Fig. 4.8). One of the first descriptions of collective urban gardens in Zagreb was by the ethnologist Dunja Rihtman–Auguštin (1988), who identified such gardens as *alternative urbanisation* undertaken by residents instead of authorities. Indeed, these unplanned gardens represented an alternative to neglected urban space (Gulin Zrnić, 2009). Valentina Gulin Zrnić (2012) saw them as urban heterotopias following Foucault's (1986) notion of *spaces of otherness*. Foucault's heterotopias are not only alternative spaces but also ways of escaping authoritarianism, and in Zagreb the unplanned gardens allowed individuals to avoid centrally planned space.

Fig. 4.8. Central Trnsko Gardens in front of Super Andrija Housing Estate (taken on 15/01/2021 by A. Predrijevac Pravdić).

Many unplanned gardens survived as heterotopias in the post-socialist period. In some neighbourhoods, they disappeared not because of conflict with planning ideals but because of land marketization. The city gardens formed since 2013 have also been situated on the margins of neighbourhoods where there was vacant city-owned land. However, their visual appearance fits in more closely with the aesthetics of conventional planned urban space. The future of collective urban gardens in Zagreb is uncertain. Despite opening and managing city gardens all around the city, the city authorities rejected the activists' idea of the official designation of gardens as a land use category, which would legally protect them from conversion into construction sites. The activism for collective gardens that came to life in 2013 has been quietened by the establishment of city gardens. Mayor Milan Bandić, who dominated city politics for over twenty years, tolerated unplanned gardens for the same reason the socialist city authorities did—to buy

peace among voters. One planner (45/F) thought he was aware that "*the fact that 'wild' gardens exist means that there's a need for them*", and the city administration could not afford to replace them all with city gardens. The prospects for both unplanned and city gardens may change following the success of the Green–Left Coalition in the spring 2021 city elections. A former green activist was elected as mayor and while he did not participate in Parkticipacija's actions and initiatives, his manifesto included improved management of the urban green infrastructure and expansion of the City Gardens project.

The end of PAPER IV.

5. The generation of cultural ecosystem services in socialist and post-socialist urban green and blue spaces in Zagreb, Croatia

> *"Options are important: that you can sit down, and that you can walk, and that you can run, and that you can play with a ball, even that you can swim if you want, and that you can… be at peace, and that you can socialise, and that you can be alone… Diversity! Maybe even that you can pick up a fruit and eat it…"*
>
> Interviewed park user (59/M/Trnsko)

This chapter is written as a research article, and it is currently being prepared for submission to *People and Nature*.

This manuscript explores the use of UGBS other than collective urban gardens in socialist and post-socialist Zagreb. It implements the 5P framework to investigate how and why certain cultural practices occur in particular planned UGBS and how that affect the generation of CEB. The chapter uses interviews with park users to investigate how personal factors interact with environmental spaces and the factors that create their character. In addition to testing the 5P framework's potential to assist urban planners in planning for CES, this chapter provides insights for practitioners about how interactions between different environmental spaces and cultural practices lead to the generation of different CEB. Understanding these interactions is necessary when practitioners plan UGBS for the people's benefit.

PAPER V

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Status of the paper: **in preparation**

Abstract

The growing appreciation of the intangible benefits people derive from interaction with nature necessitates the application of cultural ecosystem services (CES) to urban planning. While research on urban CES provision is increasing, there is still a lack of studies focusing on CES provided in post-socialist cities and how socio-political legacies might shape contemporary expressions of ecosystem services. In this paper, we explored how urban dwellers in the post-socialist city of Zagreb, Croatia, interact with urban green and blue spaces (UGBS) to generate socio-cultural benefits. The study involved field observation and interviews with 68 respondents about their perception, appreciation and use of UGBS in Zagreb. The data were categorised according to a CES typology proposed by Fish, Church, and Winter (2016) to identify cultural ecosystem services and benefits. We identified twelve environmental spaces, twenty-six cultural practices and ten cultural benefits. These were then interpreted through the 5P framework (Tandarić et al., 2020) to explore why certain cultural practices occurred in the case study UGBS and why particular benefits were generated in these environmental spaces. The 5P framework proved useful for eliciting the processes that generate the socio-cultural benefits of urban nature. This emphasis on process can assist urban planners in going beyond descriptive models to account for the complex social, ecological, historical, and political dynamics that give rise to benefits from urban green and blue spaces. The paper shows that the transition from the socialist to post-socialist period influenced the quality and maintenance of UGBS and, subsequently, their provision of CES.

Keywords: cultural ecosystem services, cultural ecosystem benefits, post-socialist city, urban green and blue spaces, urban planning

Introduction

Human societies throughout history have appreciated the intangible benefits of nature. Yet, it was not until the Millennium Ecosystem Assessment (MEA, 2005) that environmental scholars made more deliberate attempts to conceptualise, formalise and operationalise these intangible relationships between humans and nature. The term *cultural ecosystem services* (CES)—initially coined in the MEA—has become the focus of research attention (Fish, Church, & Winter, 2016; Milcu et al., 2013), and such services are increasingly valued for their role in achieving sustainability through nature-based solutions applied to landscape challenges (Raymond, Frantzeskaki, et al., 2017). This is especially relevant for cities where now most people live (United Nations, 2018). The search for sustainable solutions increasingly takes place in studies of *urban green and blue spaces* (UGBS) (Andersson et al., 2019; Haase et al., 2017), which provide socio-cultural benefits to people (Dickinson & Hobbs, 2017).

Over the last decade, the importance of UGBS for CES has been highlighted (Dickinson & Hobbs, 2017; Poniży et al., 2017) and the need to integrate CES into UGBS planning has been recognised (Kremer et al., 2016; La Rosa et al., 2016). Nevertheless, CES's definitional vagueness has hindered their assessment (Blicharska et al., 2017; Fish, Church, & Winter, 2016) and implementation in urban planning (Tandarić et al., 2020). Academic and practitioner communities have lacked clear criteria to distinguish between cultural services and benefits. Thus, CES have often been treated as a residual category in ecosystem services (ES) assessment after accounting for other services (Huu et al., 2018). To overcome this problem, Fish, Church, and Winter (2016) applied the ES cascade model (Potschin & Haines–Young, 2016) to the CES and developed a framework for researching CES that distinguishes between services and benefits (Fig. 5.1). They recognised environmental spaces and cultural practices as CES, which generate cultural ecosystem benefits (CEB) through mutual interaction. CEB can be understood as the dimensions of wellbeing in terms of "the identities they help frame, the experiences they help enable and the capabilities they help equip" (Fish, Church, & Winter, 2016, p. 212).

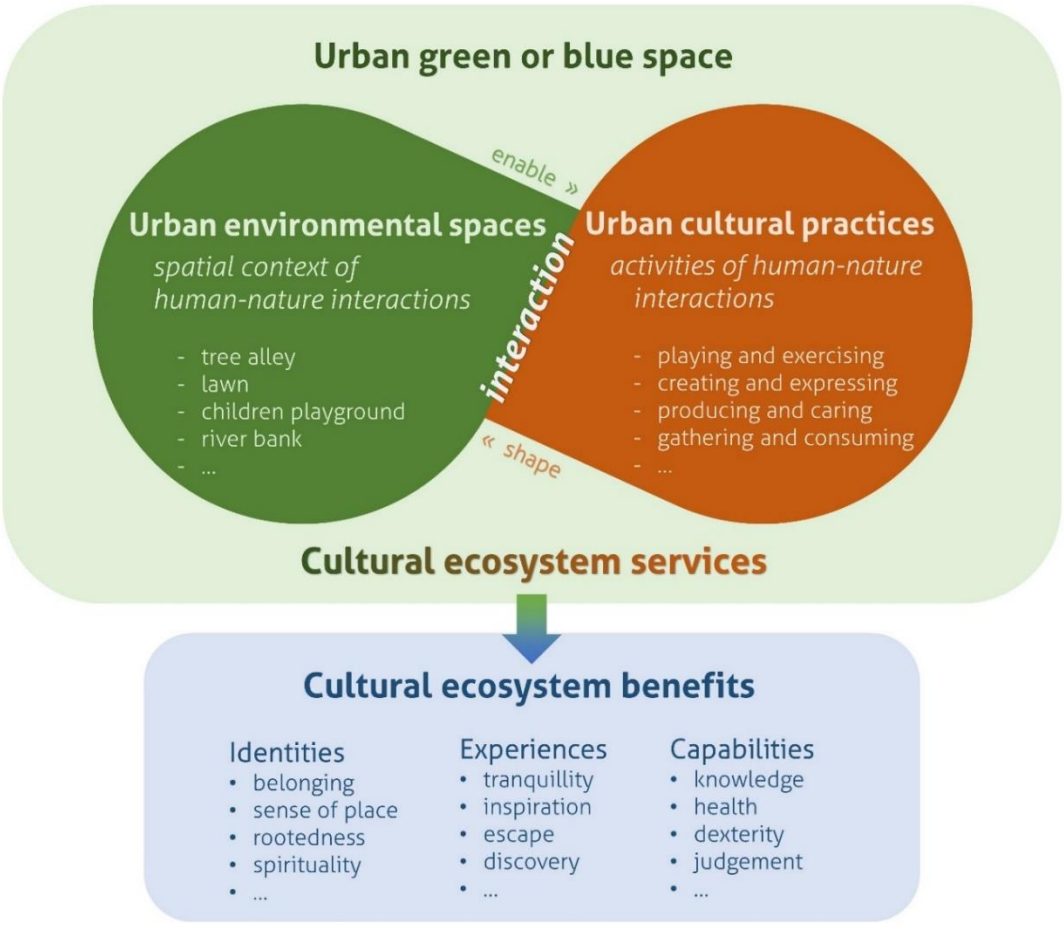

Fig. 5.1. CES research assessment framework for urban settings; adapted from Fish, Church, and Winter (2016).

Fish, Church, and Winter's (2016) framework is a very valuable contribution to cultural services and benefits assessment in research and practice. However, there is a need for planners to understand why CES occur in particular places and the processes through which specific CEB are generated. Guided by Raymond, Giusti, et al.'s (2017) argument that human–environment connections are produced through relations between mind, body, culture and environment through time, Tandarić et al. (2020) developed the 5P framework that elucidates factors that facilitate human interaction with environmental

spaces and enable CEB generation. The 5P framework is defined by five key groups of factors (Fig. 5.2):

- **Place**: Spatial features of environmental space, its surroundings, and its condition influence its potential to accommodate a multitude of cultural practices and, consequently, define the range of potential CEB that can be generated there.
- **People**: Demographic, socio-economic and psychological characteristics and value systems of users influence how they use environmental space and what CEB they can generate in interaction with nature.
- **Practices**: Cultural practices continuously shape environmental spaces modifying their ambience and thus influencing what benefits will be generated. As such, they are also important factors planners should consider.
- **Purpose**: Planned purpose, reflected in the design and equipment of an environmental space, promotes certain practices and indirectly generation of certain CEB over others. Purpose also affects the provision of intentional and incidental experiences in UGBS.
- **Past**: The known past purpose, management and use of an environmental space affect how users perceive and use it and thereby what CEB they generate there.

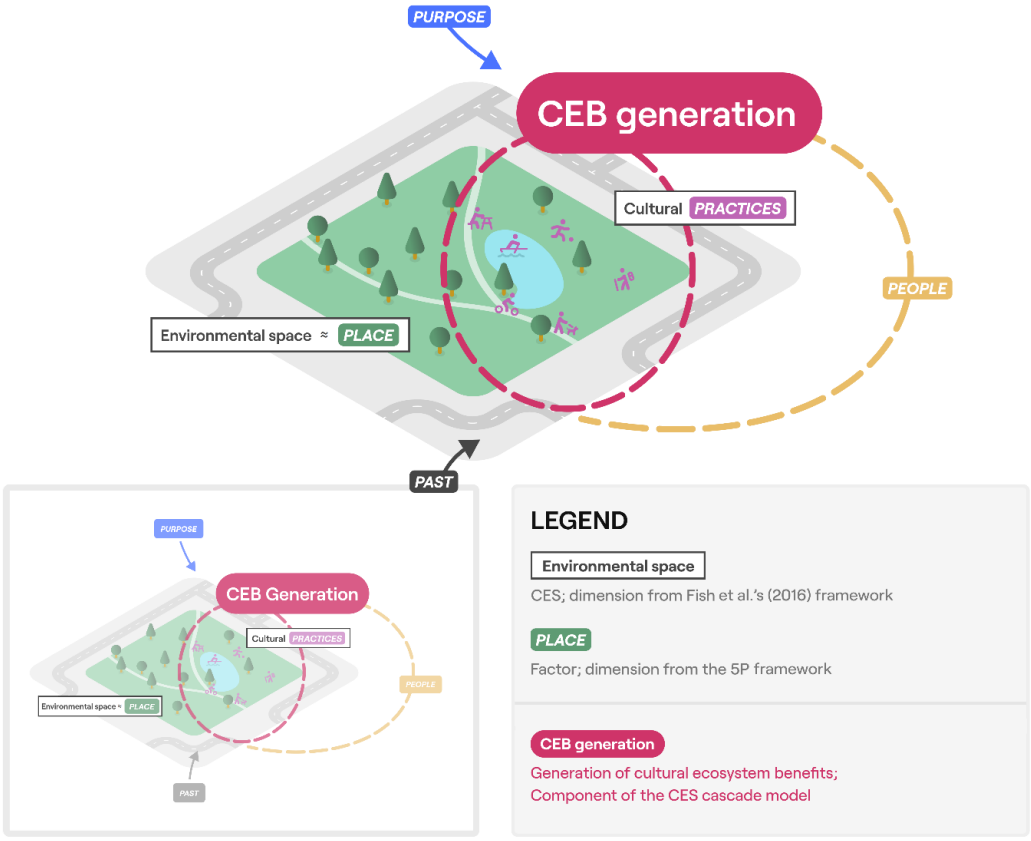

Fig. 5.2. The 5P framework for understanding the occurrence of CES and generation of CEB; adapted from Tandarić et al. (2020).

In this paper, we examine Tandarić et al.'s (2020) 5P framework's capacity to provide planners with case-specific answers that will help them understand *how* and *why* particular cultural practices occur in specific environmental spaces and how that influences the generation of CEB. We identify the CES and CEB in the particular urban settings of Zagreb, Croatia, using Fish, Church, and Winter's (2016) framework and then scrutinise the results via the 5P framework to elucidate the multifactorial processes on different levels of the CES cascade.

Literature reviews (La Rosa et al., 2016; Milcu et al., 2013) show that the findings in the field of CES are often limited to western societies, with only a small number of insights from former socialist countries (e.g. Poniży et al., 2017; Valánszki et al., 2019; Zwierzchowska et al., 2018), and especially from the cross-temporal perspective. Further, there is at present scant research on how socio-

political legacies might shape contemporary expressions of ecosystem services more broadly. Therefore, CES's examination in post-socialist settings, such is Zagreb, can illuminate the importance of socio-political context and historical governance for contemporary human–nature relationships. Moreover, since social, political and economic processes in the post-socialist context are different from those in western settings, sustainable solutions proposed for western cities cannot be simply applied to post-socialist cities (Badiu et al., 2019). Therefore, a better understanding of socialist and post-socialist attitudes towards UGBS planning and management and utilisation of CES is needed.

In addition to understanding the CEB generation process, we assess how Zagreb residents perceived, appreciated and used UGBS throughout the socialist (1945–1991) and post-socialist (1991–present) periods and how that affected their utilisation of CES. As the political centre of Croatia in both periods, Zagreb was designed and developed to represent the achievement of the regimes and national pride to both citizens and visitors (Korov, 2012). As such, Zagreb is an excellent research arena for reading and interpreting spatial and cultural imprints of different socio-political contexts and governance.

Methods

Study area

Zagreb, the capital of Croatia, developed rapidly in the 19th and 20th centuries, reaching c. 800,000 inhabitants in 2019. The research was carried out in five case study neighbourhoods ranging from the historical city centre to peripheral neighbourhoods: Lower Town, Savica, Siget, Trnsko and Jarun (Fig. 5.3). These provided diverse and contrasting UGBS, from city centre parks designed in the 19th century to green spaces associated with socialist and post-socialist developments. As Siget and Trnsko are adjoining neighbourhoods with a large shared UGBS (Newlyweds Park), they were approached as a single case study unit.

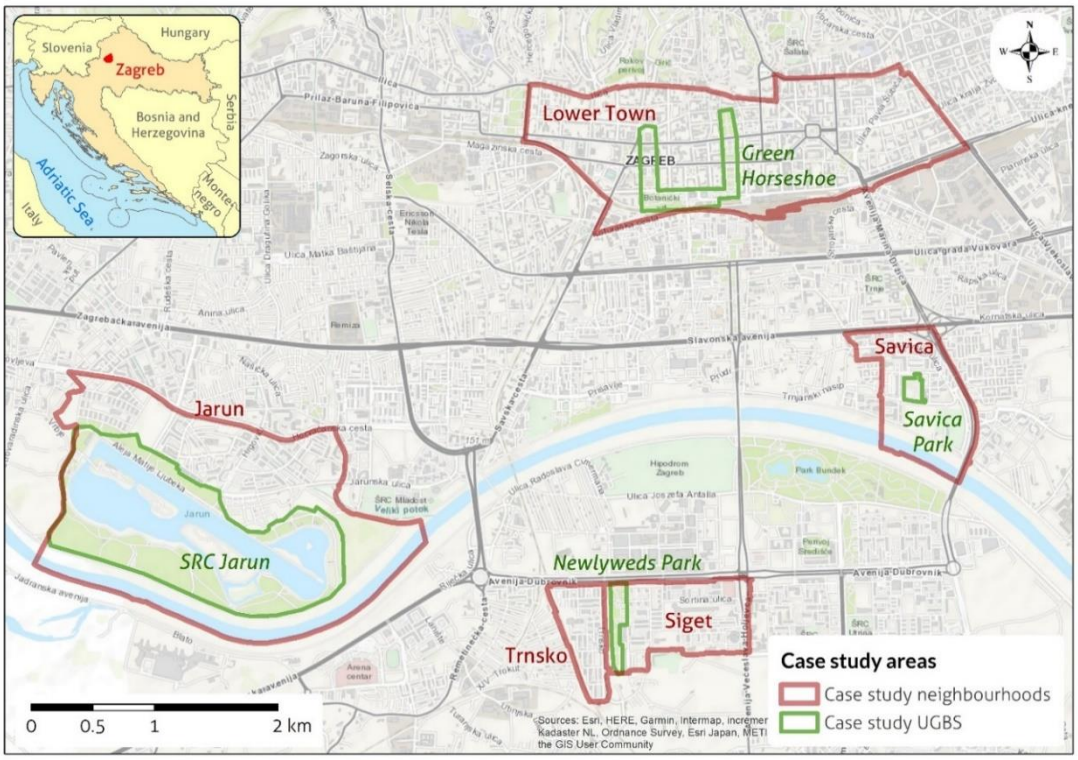

Fig. 5.3. The five case study neighbourhoods.

Data collection

We combined field observation in UGBS with interviews with various stakeholders to obtain qualitative and quantitative data on frequency, forms and motives of use of UGBS, and their perception and appreciation. The fieldwork took place between July 2019 and January 2020. Semi-structured qualitative interviews were undertaken with 68 individuals in three cohorts: park users (hereafter: users), activists for the protection of UGBS (activists), and academics from various disciplines (urbanism, landscape architecture, sociology, geography, anthropology). Here we report results from users supplemented by perspectives from activists and academics where relevant.

We used stratified purposive sampling, and participant representation was sought across a number of pre-defined socio-demographic and occupational categories. The bias in the selection of participants was reduced by approaching potential respondents in these categories. In the final phase of interviewing in

each cohort, we approached participants from under-represented categories. Users were approached in UGBS while they sat on benches or the grass or strolled through the area, based on their age, sex and type of use (casual walkers, recreationists, dog walkers and babysitters). Activists and academics were approached via email and following their consent for participation, an interview date, time and venue was arranged. Activists in the case study neighbourhoods were identified through analysis of media (newspaper and online articles). Academics were identified in the relevant literature and sampled to achieve disciplinary diversity. The final sample consisted of 51 users, nine activists and eight academics (Table 5.1). The general response rate for users (defined as the proportion of individuals who responded positively to being approached and invited to participate in an interview) was 58.6%, but this varied from 55.0% in Jarun to 70.6% in Savica. The response rate in the other cohorts was 40.0% for academics and 69.2% for activists.

Distinct interview protocols were developed for users, activists and academics, but all protocols covered the same broad topics. They were structured and administered to allow detailed exploration of any question and lasted between 8 and 158 minutes. The mean length was 48 minutes. We also carried out systematic observation in two case study parks—Savica Park and Newlyweds Park—to assess variations in how users interacted with urban nature. The observation was conducted for four days in a row, three times a day (morning, early afternoon, dusk) at the same time each day. When counting users, all direct users (including passers-by) were included.

Table 5.1. Socio-demographic data on interview participants.

Variable	Category	Respondents (%)		
		users	activists	academics
Total number		51	9	8
Gender	male	41.2	44.4	37.5
	female	58.8	55.6	62.5
Age	18-30	27.5	0.0	0.0
	31-65	31.4	100.0	75.0
	66+	41.1	0.0	25.0
Work status	employed	39.2	100.0	75.0
	unemployed	2.0	0.0	0.0
	student	9.8	0.0	0.0
	retired	47.1	0.0	25.0
Neighbourhood	Lower Town	11.8	0.0	/
	Savica	25.5	33.3	/
	Siget/Trnsko	15.7	11.1	/
	Jarun/Vrbani	11.8	0.0	/
	other	35.3	55.6	/

Data processing

The great majority (65) of the interviews were audio-recorded; notes were taken for the three respondents who did not want to be recorded. All the interviews were transcribed verbatim in Croatian, and the analysis was undertaken in Croatian to avoid loss of meanings and subtle indications that could not be translated into English. Transcribed interviews were then organised using the software package NVivo 12. Given that interview questions often yielded short answers, data were firstly organised concerning the questions and cohorts and coded accordingly. The second round of coding aimed at identifying categories from Fish, Church, and Winter's (2016) framework. Only explicit statements were identified as framework categories, while inferred ones were

omitted. Finally, the question-based topics were organised into five themes following the 5P framework: place, people, purpose, past and practices. This was done in order to explore how each of the 5P factors influences and shapes cultural practices and CEB. After each round of coding, key terms were translated into English, with these translated terms used in this paper.

Results

Detected cultural practices and benefits

Reported cultural practices

Users reported 24 practices they usually performed in UGBS, with most diverse practices mentioned in Jarun (15) and Lower Town (13) and less in Savica (11) and Siget/Trnsko (10) (Fig. 5.4). Approximately half of the respondents *strolled* (53.3%) and *sat on the bench* (46.7%); this was reported relatively evenly across neighbourhoods. The other frequently mentioned practices were *dog walking* (28.9%), *reading* (20.0%) and *hanging out* (17.8%), but they oscillated more among different neighbourhoods. The performed practices contribute to reading the profile of human–nature interactions in a particular UGBS. Low-energy physical activities (like *sitting on the bench* or *eating, drinking with a view*) were (expectedly) mentioned the most in the Lower Town and least in Jarun where users reported most of the high-energy physical activities (like *cycling* or *running*). According to mentioned socialising practices (*hanging out* and *meeting new people*), the social character of UGBS was more pronounced in residential neighbourhoods (Savica, Siget/Trnsko) than in neighbourhoods where dwelling is combined with other functions.

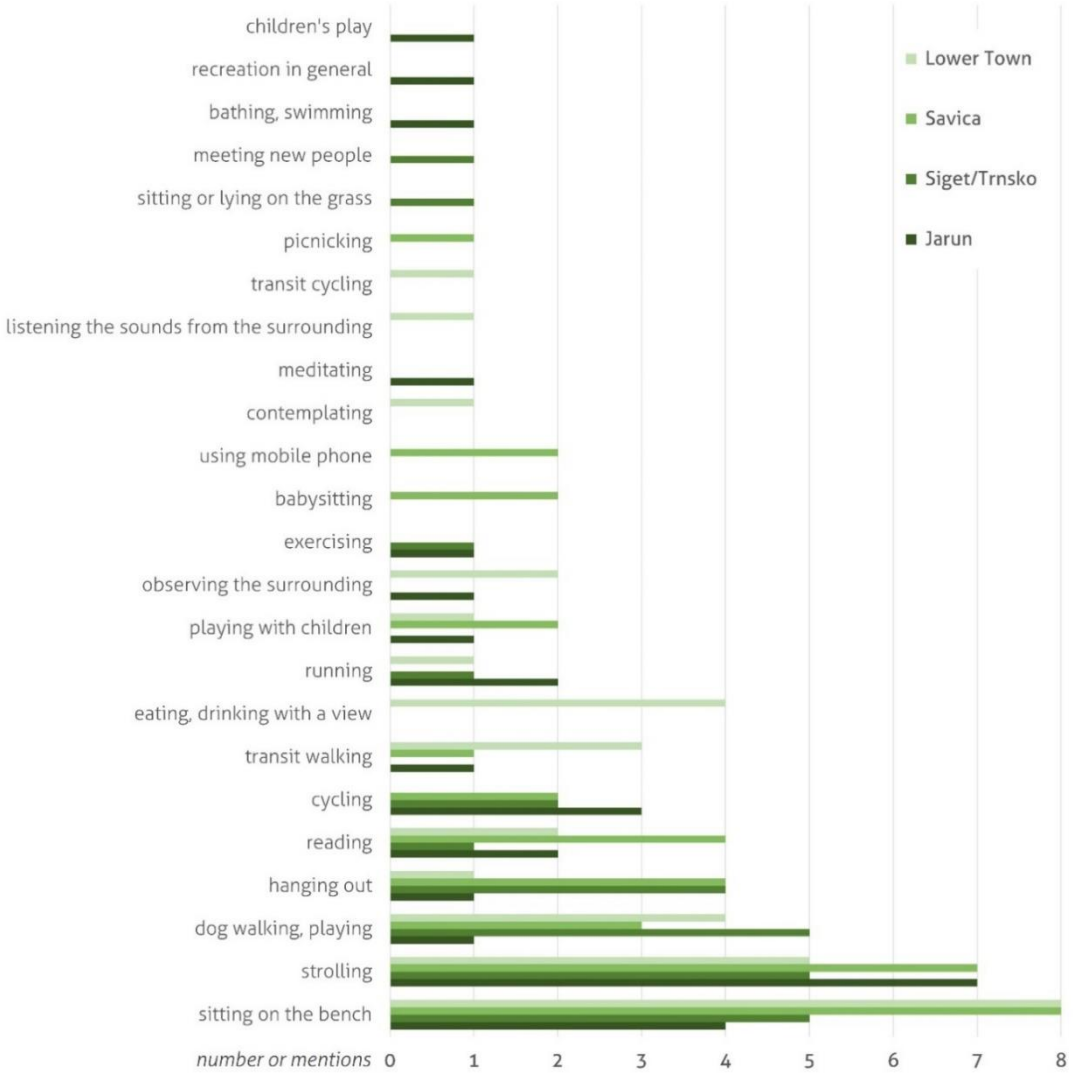

Fig. 5.4. Reported cultural practices in the case study neighbourhoods.

Observed cultural practices

The number of different practices reported in Savica Park was the same as observed, while in Newlyweds Park we observed six more practices than reported (10) (Fig. 5.5). We did not observe the occurrence of reported *picnicking* and *reading* in Savica, but we noticed *children's play* and *eating, drinking with a view*, which no one reported. In Siget/Trnsko we did not observe *reading*, *sitting, lying on the grass* and *meeting new people*, which were reported. However, we noticed *children's play*, *babysitting*, *transit walking*, *playing with children*, *dating*,

transit cycling, *running*, *using mobile phone*, *eating, drinking with a view* and *fast walking* which were not reported.

In both UGBS, *strolling*, *sitting on the bench*, *hanging out*, *children's play* and *babysitting* were the most frequently observed practices, but their representation differed in two parks. High frequency of children-related practices does not surprise given that children made up 43.9 and 20.4 per cent of observed users in these parks respectively. They belong to the age group that was not interviewed. Besides *children's play*, children activities contributed to *cycling* practice in Savica and *strolling* in Siget/Trnsko. Almost half of all adult practices in Savica observed were related to *babysitting* (babysitting on foot, sitting on the bench while babysitting, playing with children and strolling with children) while in Siget/Trnsko this was the case among only a fifth of adult users. The observation data also affirmed the higher number of high-energy physical activities in Newlyweds Park (13.7%) than in Savica Park (2.1%).

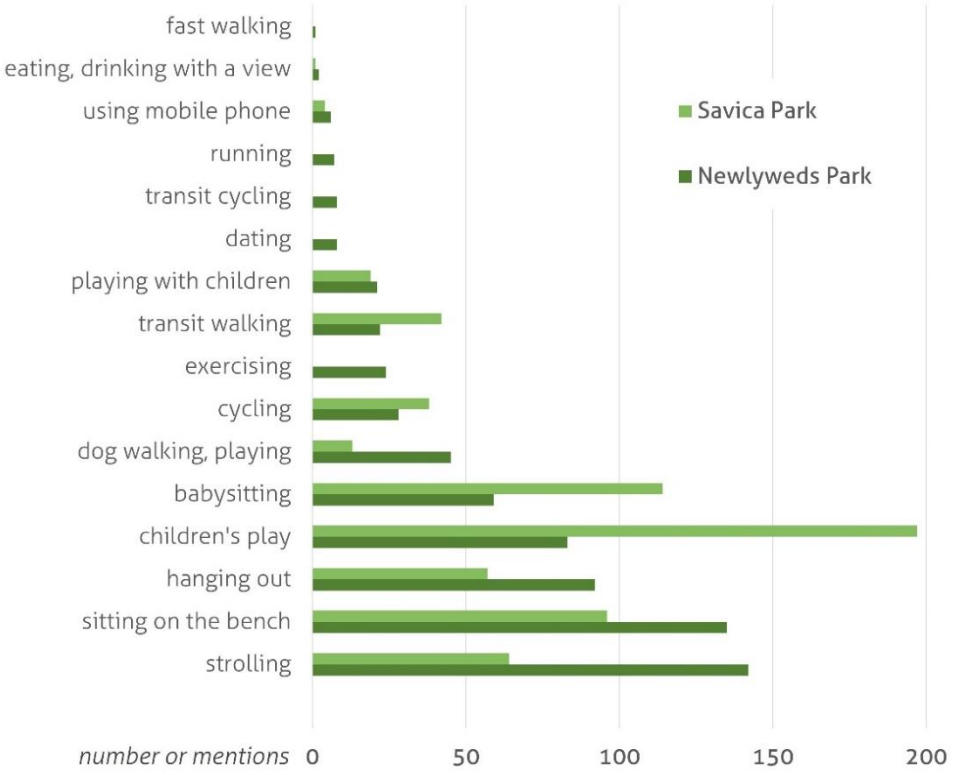

Fig. 5.5. Cultural practices observed in Savica and Newlyweds parks.

Reported cultural ecosystem benefits

In total, users reported ten different CEB they usually generated when they spent time in UGBS (Fig. 5.6). Translated into Fish, Church, and Winter's (2016) framework, experiences were mentioned the most – users reported six different experiences, and they composed 63.0 per cent of all reported CEB. Most frequently mentioned were *pleasure of spending time in nature* and *escape* from built and social environment (14 each). *Health benefits* was the only capability reported, but at the same time, it was the most mentioned individual CEB (16). Identities were mentioned less often, mostly as a satisfied *attraction to spending time in nature* (8). Spatially, CEB were reported the most in the Lower Town (29), less in Jarun (20) and Savica (16), while the least in Siget/Trnsko (8), which is somewhat proportional to the total number of practices reported in these neighbourhoods. The same sequence of neighbourhoods applies when looking at the diversity of mentioned CEB. Importance of *health benefits* was more pronounced in the Lower Town and Jarun than other neighbourhoods. *Pleasure of spending time in nature* was mentioned relatively evenly among neighbourhoods while the option of *escape* predominantly benefited users in Savica and the Lower Town. Interestingly, users in the Lower Town *enjoyed aesthetic qualities* of UGBS more than other users, while users in Jarun dominantly felt that they could satisfy *attraction to spending time in nature*.

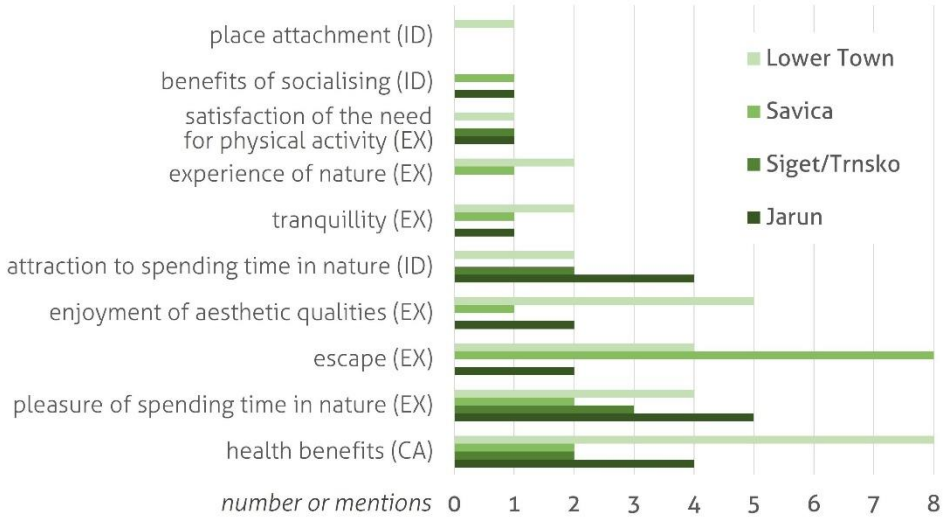

Fig. 5.6. Reported cultural ecosystem benefits in the case study neighbourhoods.

The 5P analysis of detected practices and CEB

Place

The four case study UGBS differ in size, design, terrain composition, diversity of vegetation and surroundings (Fig. 5.7), all of which influence their potential to accommodate a multitude of cultural practices and consequently define the range of potential CEB that can be generated there. Green Horseshoe (c. 190,000 m^2) is a U-shaped chain of nine parks in the Lower Town (city centre): Republic of Croatia Square, Mažuranac, Marulić Square, Zagreb Botanical Garden, Lenuci Fitness Park, Starčević Square, Tomislavac, Strossmayer Square, and Zrinjevac. The parks' spatial character is defined by small size (4,400–21,600 m^2), formal design of the flat lawns with sparse broadleaved trees, and a network of concrete and gravel paths. Excluding public buildings located in some parks, there is a clear sight from one end to another which discourages intimate practices like *meditation* and *contemplation*. Botanical Garden differs from other parks as it is more extensive (c. 47,000 m^2), designed in mixed formal and landscape style and vegetation is more diverse. Nevertheless, each park has its own character, reflected in the relatively high number of cultural practices and CEB reported there.

Many respondents mentioned negative aspects of these parks, such as small size and direct surroundness by the city (buildings and traffic). When asked to compare these small, formal parks with Maksimir, a large landscape park in Zagreb, most responses could be depicted in a statement given by a young casual walker (21/M) who said: "*Zrinjevac, Tomislavac… they are full of people, traffic, too noisy. There's no tranquillity. That's more a place for socialising, where people come specifically to hang out. And I think that's more for people who have less time because Maksimir is farther from the city centre. There you can really retreat and enjoy the peace.*" The Lower Town is a predominantly built-up area, which might explain why the users frequently reported the benefit of *escaping* from the built and social environment when spending time in parks.

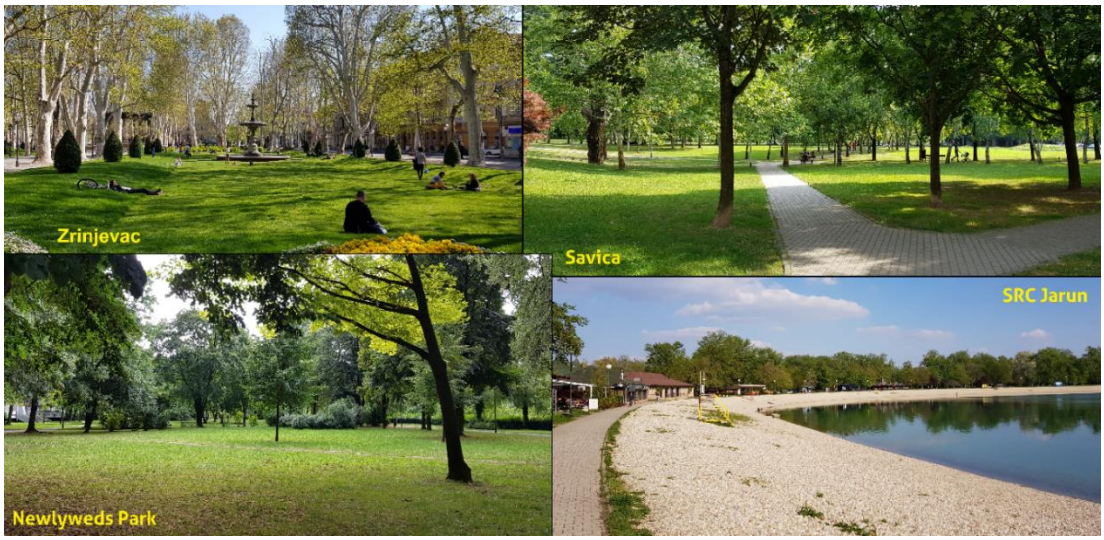

Fig. 5.7. Case study parks (photo of Zrinjevac was taken on 16 April 2019; other photos were taken on 13 July 2019).

Somewhat larger than the Green Horseshoe parks, Savica Park (c. 30,000 m^2) is the central park of Savica Neighbourhood, designed in a loose landscape style with extensive lawns. Vegetation consists mainly of grass and broadleaved trees planted along the paved paths. The park has good visibility from one end to another and is surrounded by multi-storey residential buildings, but its size and a large number of trees allow park users to value *escaping* from built and social environment more than any other CEB.

Newlyweds Park (65,000 m^2) is an elongated greenspace between Siget and Trnsko neighbourhoods. It is designed mainly grassland and partly densely wooded with both broadleaved and coniferous trees and shrubs. There are occasional benches along concrete paths, two playgrounds, a fitness court and an enclosed dog park. Elongation, design and diversity of vegetation cause limited visibility in the park enabling diverse ambients and opportunities for interaction with nature. The fitness court and large park area provide opportunities for recreational activities which observed users seemed to seize. Both Siget and Trnsko were built in Corbusian style as multi-storey buildings surrounded by plenty of greenspace. This might explain why no respondents mentioned the benefit of *escaping* from the built and social environment.

Jarun Sports and Recreation Complex (SRC Jarun; 2,350,000 m^2) is one of Zagreb's largest UGBS. The large central lake is surrounded by deciduous woodlands and meadows with sports courts, picnic area and fitness park in its eastern part. The complex facilitates a number of sport and recreational activities and leisure practices. UGBS size, design and diversity of vegetation create even more diverse ambients and opportunities for interaction with nature than in Newlyweds Park, which is reflected in the most diverse list of reported practices. Also, a larger number of natural elements and its proximity to Sava River provide more opportunities for incidental encounters with natural phenomena than other UGBS.

People

Each case study UGBS has different users whose socio-demographic traits influence cultural practices they perform there, while their previous experiences, values and viewpoints shape the resulting benefits. Green Horseshoe and SRC Jarun are city-level parks with wider spatial reach than the other two UGBS. Green Horseshoe is popular for tourists, but it also attracts residents and people employed in the Lower Town. Given that there are not many children's playgrounds and no dog parks in the vicinity, babysitters and dog walkers choose Green Horseshoe and other parks for related practices. A casual walker in the Lower Town (26/F) noticed that: "*Every evening if you walk in that park, you will see dog walkers who hang out there, standing in a circle, people sitting… some friends who catch up…*" SRC Jarun attracts recreationists and athletes from Zagreb and the region, as well as people seeking leisure. On the other hand, Savica and Newlyweds parks attract primarily members of families living in adjacent buildings. Observation data showed that children and their babysitters make up most visitors and consequently *babysitting* and *children's play* were frequently observed.

The visitors' profile influences their visiting pattern. The majority of users reported visiting UGBS every day (58.8%) but that varied. Expectedly, all the dog

walkers and almost all babysitters frequented UGBS daily. In general, the share of those visiting daily decreases from retired (69.6%) to employed users (54.5%) to students (20.0%). Most participants reported that they visited throughout the year, but less frequently in the winter (85.7%). During warm months, participants reported spending between less than 30 minutes and more than 4 hours in the park daily, with most of them reporting 1-2 hours. The responses did not vary between case study neighbourhoods but did somewhat among occupation groups: the share of users spending less than average time in the park increased from retired (20.0%) to employed users (28.6%) to students (66.7%). We observed a similar total number of users in Savica (494) and Newlyweds Parks (529) over four August days in terms of a daily visit pattern. In both parks, the pattern was similar – with fewest visiting in the early afternoon (around 2 pm) and most in the evening (around 6 pm) as shown by the V-shaped 'average' line in Fig. 5.8.

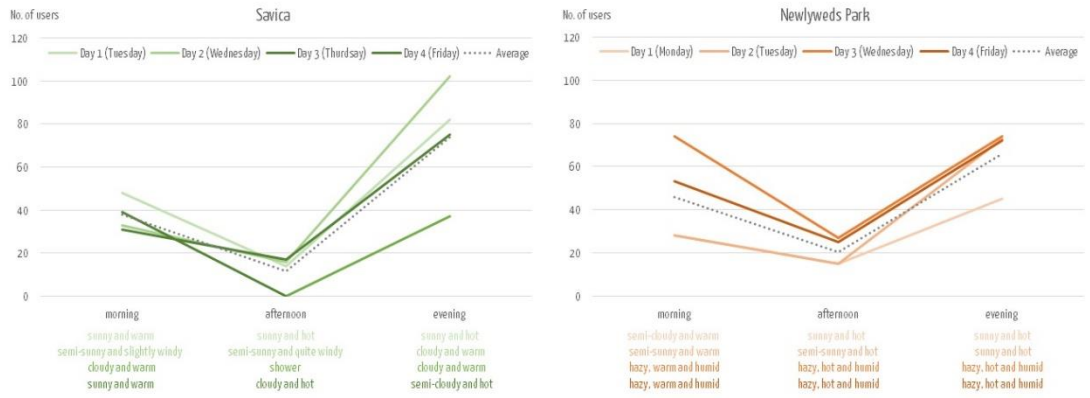

Fig. 5.8. Observed use of the Savica Park (left) and Newlyweds Park (right) in the morning, afternoon and evening in four days in a row in late August 2019. Below the horizontal axis, there are short descriptions of weather for each day (nuances) at the observed time.

When asked about historical changes in the use of UGBS a similar number of participants perceived that the frequency of visiting UGBS after 1991 had increased (29.7%), decreased (27.0%) or remained unchanged (24.4%); others

were not sure (18.9%). The answers did not vary significantly among neighbourhoods. The reason for the decrease stated the most was technology, as well depicted by a dog walker (59/M) from Trnsko: "*In the time before the internet, before this pollution with mobile phones, we kids lived on the benches. We didn't visit each other's home – we lived outside on the benches, and there we hung out. Whereas today, people hang out at home over the internet or…*" Reasons to explain a perceived increase were more numerous and scattered. Those mentioned more than once were increased awareness of healthy lifestyle which usually entails physical activity in urban nature, the claim that people used to travel outside of cities more often in the socialist period while now they use that time to visit UGBS, and the increasingly recognised dogs' needs.

The interview and observation data indicated that young people spend less time in parks than other age groups, especially the elderly. Few young men were observed in Savica and Newlyweds parks, while some young mothers were observed *babysitting* or *playing with children*. Nineteen respondents remarked that youths use parks differently from other users: if they did not walk dogs, youths tended to use parks in the evening hanging out and listening to music and drinking. Eight respondents noticed that nowadays youths visit parks less than before; five of them were respondents in their twenties and thirties who also reported that they used to *hang out* in parks much more when they were children. An academic sociologist (43/F) argued that urban youths tend to behave similarly across the world, "*they have mobile phones, they all frequent fast-food restaurants and they combine it most of the time with strolling, that is, wasting time in shopping centres.*" She thought youths only went to parks "*at night when the shopping centres are closed.*"

Five participants argued that today's youths find no need for spending time in parks. One activist (50/F) explained this lack of interest with changing priorities in different personal development stages among young people. She noted "*When I was that young, I always wanted some company, I wanted a different kind of socialising, enjoyment, spending time than now. When I started working and became more stressed, I started wanting peace and silence.*" From a youth

perspective, a young man from Savica (20/M) thought that "*Parks probably can provide something different than other spaces, they probably can, but, I don't know, to me… I just don't find a need for them.*" Another young recreationist in Trnsko (21/M) commented that "*I don't have the time to calm down and enjoy the park. I don't know. I always have some, I mean, even stupid things to do and it just doesn't cross my mind to go to the park.*"

Purpose

The purpose of a UGBS affects the practices likely to be performed in it. Two key factors influence a UGBS's potential for facilitating practices in this context – its dedicated design (including accompanying equipment) and maintenance. The parks of Green Horseshoe were designed for predominantly passive uses like *sitting on the bench* and *strolling*, while at the same time serving as an aesthetic "green backdrop" for the public buildings located in some of them. There is rarely equipment for other active uses; in Mažuranac, there are devices for *children's play* while in Lenuci Fitness Park users may *exercise*. The majority of interviewees (79.5%) noticed that the Green Horsehoe parks were better looked after than those in other parts of the city. Most thought that the need for Zagreb to attract tourists was the principal reason. A casual walker in the Lower Town (29/F) noted that the city centre was "*the place where most people will come. There are all the city institutions, so it makes sense – in terms of presentation.*" Consequently, users often reported the benefit of *enjoying aesthetic qualities* of Green Horseshoe parks. An equal proportion of respondents believed that the quality and maintenance of parks in the Lower Town had increased, decreased and remained unchanged (33.3% each) since the socialist period.

More than two-thirds of respondents (69.2%) thought that the UGBS farther from the city centre did not have adequate equipment to fulfil their purpose. A casual walker (29/F) from a nearby district who regularly visited the Lower Town argued that peripheral parks should have greater investment "*so that the best parks are not only in the centre, while in the periphery they put some*

meadow and expect that people will be happy with that." The neighbourhood parks should be "*more special parks than just putting a slide, swings, two benches, and that's it.*" For instance, Savica and Newlyweds parks were intended for active and passive daily use by residents and the equipment facilitates dominant practices like *sitting on the bench* and *strolling*. Children playground devices in these parks enable *children's play* and *babysitting* practices while the fitness devices in Newlyweds Park enable *exercising*.

However, several interviewees complained that these parks lacked equipment such as children playground toys for different ages, enough benches for all the users, drinking water fountains, or that their design did not facilitate their intended purpose. For example, a dog walker (59/M) criticised the dog park's layout in Siget/Trnsko: "*They planted trees and installed benches. But not a single bench is in the shade. Ever. So the trees are for nothing and benches are for nothing.*" He also noted that "*They constructed winding paths, designed in the office, on the computer, but people walk straight. They don't stroll there, that's not for older people, it's for dogs.*" According to respondents' dominant view, the quality and maintenance of local parks in Siget and Trnsko decreased (66.7%) since the socialist period while no respondents thought otherwise. This suggests that the potential for facilitating cultural practices might have declined in the post-socialist period. This is in line with the lowest number of reported practices and CEB in Siget/Trnsko. In contrast, respondents in Savica generally thought that local parks' quality and maintenance either increased (40.0%) or remained the same (40.0%).

SRC Jarun was constructed as a venue for an international sports competition in 1987 and has a clear sport and recreation function. This purpose can be read from reported high-energy physical activities. Still, respondents complained about the priority given to some other parks over Jarun in terms of care and maintenance. A dog walker from Siget (52/M) noted that he visited "*Jarun, but very rarely lately because it doesn't seem well maintained anymore*". He pointed out "*big problems with water lilies at places where rowers train, hence they have problems even with training.*" Another (63/F) had stopped swimming in the

lake because it was "*not as clean as it used to be.*" Such statements point out the decreasing ability of SRC Jarun to fulfil its purpose.

Apart from the planned purpose, UGBS can also have purposes created by everyday users' regular use. Several respondents saw the parks as an extension of their homes. An activist (37/F) saw parks "*as spaces of social interaction, that is, an extension of a living room in urban environments where people own much less space than in villages where they can spend more time in private greenery.*" Another activist (43/F) elaborated on features of the park that she perceives as a 'living room' park: "*In our park and in parks in front of residential buildings, people come to sit down, have a coffee with neighbours, play with children, or children come to play with other children, etc.*' She contrasted that to Zrinjevac which "*is something completely different. No people are living around Zrinjevac, only people who work around it and who walkthrough. (…) People come to Zrinjevac because it is Zrinjevac: 'I will come here, sit down a bit, walk around it, if there's a book fair I will come to see books, maybe buy some…'*"

Some other respondents saw their local park as a backyard such as a dog walker from Jarun (65/F): "*We stroll around, play football with children, we talk and laugh to late at night… Well, this park is like a backyard for us.*" Most responses about this topic stressed the socialising function of park. A dog walker in Siget/Trnsko (35/M) said that without parks "*there would be no hanging out.*" Many also stressed the purpose of parks as a refuge from a flat. A dog walker from Savica (56/M) explained: "*I get away from the television, get away from home problems and come here to be carefree*", while an activist (58/F) said "*Say, if we quarrel at home, I go out to the park and walk, and then I sit down on the bench and calm down. I really do.*"

Past

While users' past experiences shape the CEB that may be generated, the past of a UGBS might influence how users will behave in it and what practices they will perform. The Green Horseshoe parks were laid out mainly between 1872 and

1914 (Drljević, 1976) and they were designed mainly as a regular path network laid over decorative green matrix with trees, fountains and flowerbeds. A low fence around the green matrix surfaces signalled that they were not supposed to be used for *walking, sitting or lying on the grass*, only to be *observed* while *strolling* or *sitting on benches* along the paths (Gulin Zrnić, 2020). This view persisted through the socialist period, and walking on the grass in the Green Horseshoe was disapproved of by both residents and authorities. This has only recently started changing. A babysitter from Savica (64/F) who moved to Zagreb from a rural area in the 1980s remembered: "*when my child stepped on the grass, the park keeper whistled that he mustn't walk on the grass, but dogs were allowed to.*" A dog walker in the Lower Town (69/M) said that until recently "*It was forbidden to sit down on the grass before; the police wouldn't let you. In the socialist period. Over the last five or six years, I see that people sit on the grass.*" An academic sociologist (72/M) agreed that central parks are nowadays used more actively than before and that "*the first big change in the recent years*" was "*that you can sit down on the grass at Zrinjevac. Like a picnic*." He thought this signalled "*a change in attitude*" such that "*it's not merely a green park detached from use, but instead that it can be used actively.*" Nevertheless, the past ways of use still influence how some participants would use the Green Horseshoe parks. An activist (50/F) stressed that those parks "*should be used in a way that walking on the grass is not allowed.*"

The city authorities recently introduced temporary decorations and new uses of the Green Horseshoe parks such as fairs with food tents, winter ice-skating rinks, and artificial beaches in summer, which provoked diverse and strong views. For instance, a dog walker from Lower Town (65/F) who enjoyed the cultural heritage of the Green Horseshoe disliked the summer beach at Zrinjevac: "*When they put loungers there and bathing, I don't know, all kind of stuff, to me – it's disgusting. That's the historical centre of Zagreb!*" Similarly, one activist (50/F) thought that King Tomislav Square was "*devastated by overuse*" and that the "*lawns are destroyed, and it takes a very long time for them to recover.*" On the other hand, a casual walker from Savica (73/F) who did not care too much about the history of parks stated that the decorative jellyfish hanging from the trees

"*astounded me. It's beautiful.*" One activist (43/M) thought that the great variety of new uses in the Green Horseshoe indicated to planners that there is "*a great need for parks which would be able to host different events in different seasons, but we don't have such parks yet.*"

Respondents from Siget/Trnsko were keen to explain the origin of Newlyweds Park. The park was constructed between 1964 and 1978, based on the idea that at every wedding, the newlyweds would choose and pay for a tree to be planted (Klaić, 1974). Many interviewees proudly stated that a tree was planted in memory of their wedding in the park. The past factor here relates to the intense personal connections that users had formed with the park and the important historical cultural practices. One casual walker (70/M/Siget) said "*My wife… she died six months ago, but when we would stroll around here, she would say: 'Here's our tree.' I've kept coming here without her…*" Participants did not comment on the history of Savica Park and SRC Jarun which were laid out in the last decade of the socialist period. Some respondents, however, expressed regrets about the reduction in care and maintenance of SRC Jarun, which was once "*Zagreb's gem*" (66/M/Trnsko). Although the park still has many visitors, some users were put off by its deteriorating condition (see statements in section 'Purpose').

Practices

While observed and reported practices were detailed in section 'Detected cultural practices and benefits', here we outline how practices relate to UGBS features and the processes by which practices contribute to CEB. An important aspect of CEB generation is what motivates people to visit the park in the first place. We translated motives into cultural practices (48.2%) and benefits (51.8%). Although practices that motivated interviewees for visiting UGBS largely correspond with reported forms of spending time in UGBS, many participants engaged in practices that were ancillary to the primary reason for visiting. For example, not all who *stroll* (53.3%) and *sit on the bench* (46.7%) said

they were motivated by these practices (17.4% and 13.0%). On the other hand, *dog walking* motivated all respondents who spent their time in UGBS that way. Interestingly, in contrast to other respondents, dog walkers (and to a lesser degree babysitters) rarely mentioned other motives. Apart from these practices, users frequently mentioned *reading* (13.0%) and *observing the surrounding* (10.9%).

Several interviewees mentioned benefits as motives for visiting UGBS. While these were less diverse than practices (14 vs 20), they tended to motivate more people than individual practices. *Health benefits* motivated 41.3 per cent of users, especially the psychological effect of relaxation and stress relief. One casual walker in the Lower Town (29/F) stated: "*I consider nature to be the greatest psychologist. And, well, it relaxes.*" She went on to note "*I become quite nervous if I don't go out in nature at least once a week.*" Older interviewees often stressed benefits for physical health, and some were recommended to visit the park by their doctor. A casual walker from Jarun (78/M) said: "*My hips and legs hurt. So my rheumatologist said that I have to walk. And I stick to that.*"

Many respondents mentioned *escape* from the built and social environment (30.4%) along with *health benefits*, whereas *pleasure of spending time in nature* (30.4%) was often bundled with other benefits and practices. This is demonstrated by a casual walker in the Lower Town (30/F) who said "*When I go to the park intentionally, it's because of relaxation, escape from work and daily stress and everything, so that… it's pleasing…*" Many respondents also *enjoyed aesthetic qualities* of a park (13.0%). This CEB was also frequently bundled with practices, for instance: "*I like to stroll on these paths and nicely designed surfaces. It calms me down. And it feels better to, I don't know, walk through the park if I need to get somewhere, because of the beautiful nature, than walk down the street.*" (29/F/Lower Town). On the other hand, some people felt an abstract *attraction to spending time in nature* (15.2%). One dog walker (38/F) from Trnsko said "*I love greenery, and I love nature. I love being… living at locations where there are parks, where you can relax nerves a bit, and at least be in the vicinity of nature because we've got quite detached…*"

Despite CEB being shaped by an individual's previous experiences, values and viewpoints, they originate from cultural practices interacting with environmental spaces. We explored how reported benefits relate to reported practices in the case study neighbourhoods. The Lower Town was characterised by low-energy physical activities and cognitive activities like *reading* or *observing the surroundings*. Users reported gaining diverse experiences like *pleasure of spending time in nature*, *enjoying aesthetic qualities* but also *escaping* from built and social environments. Capabilities in terms of *health benefits* seem to be more important than in other neighbourhoods. Only rarely did activities in parks help to frame users' identities. Apart from low-energy physical activities, there were numerous dependant-involving, cognitive and socialising activities in Savica, which favour outdoor over the indoor environment and may contribute to the generation of *escape* benefit which was reported more in Savica than other neighbourhoods. Moreover, users of Savica Park seemed to generate and value experiences much more than other types of benefits. The distribution of groups of reported practices was most even in Siget/Trnsko, and this was reflected in relatively an even distribution of reported experiences (*pleasure of spending time in nature*), capabilities (*health benefits*) and identities-related (*attraction to spending time in nature*) benefits. A similar distribution of benefits was noticed in Jarun, where high-energy physical activities were coupled with low-energy physical and cognitive activities.

Some cultural practices may cause incidental experiences. For instance, a dog walker from Trnsko (38/F) said that in Newlyweds Park: "*I met many good people. Pets are mostly responsible for that.*" However, most of the reported incidental experiences were negative. In Savica and Newlyweds parks, some interviewees complained about the crows scattering litter around the bins, leaving excrement on benches, or attacking their dogs. One casual walker from Savica (70/M) said that crows "*pick the dog faeces from litter bins, they pull it out and… I wouldn't sit there anymore because it stinks…*" It seemed that practices performed by other users caused many adverse incidental experiences. Respondents complained about dog faeces on paths and grass, felt threatened by

uncontrolled dogs or the presence of certain social groups in UGBS, such as drug addicts, alcoholics or migrants. A recreationist in Siget (21/M) said: "*Everything negative that I've experienced came from other people. They're rude sometimes, or they don't pick after their dogs…*" A walker from the Lower Town (65/F) said quietly "*Here, for example, there are so many refugees and drunks that… we're scared to go out with dogs after dusk.*" Interestingly, negative incidental experiences reported tended to originate in the post-socialist period while the positive ones mostly originated in the socialist period.

Discussion

Interconnectedness of the 5P factors

We conducted interview and observation data on perception and use of UGBS in Zagreb through two levels of analysis. First, we identified CES (environmental spaces, cultural practices) and CEB (experiences, capabilities, identities) categories using Fish, Church, and Winter's (2016) framework. Then, we scrutinised the results via the 5P framework (Tandarić et al., 2020) to explore how the 5P factors influence and shape generated CES and CEB. Our findings showed that each of the 5P factors was relevant for explaining reported and observed practices and reported CEB in the case study UGBS. More importantly, 5P factors proved to be interwoven in a way that several elements were relevant in the analysis of more than one factor (such as size, design, equipment, users' preferences, motivation, etc.). Each factor contributed to understanding the context in which users performed practices to interact with nature and generated CEB.

The simultaneous influence of factors can be best illustrated using examples. A pocket park in Jarun may be well-equipped with children's toys [*purpose factor*], so that it attracts children and babysitters. As the park is situated within a residential block [*place factor*], it provides safety from traffic and suitable space for children's play and socialisation and CEB deriving from these and other suitable practices. However, some of the block residents who own dogs

cannot use the pocket park for *dog walking* because of the small children's presence [*people factor*]. They have to go to another UGBS with their dogs. The same factor is relevant for those seeking solitude for contemplation or meditation in nature. Similarly, the pocket park [*place factor*] cannot facilitate most recreational activities, so residents interested in recreation have to find a more suitable UGBS if they want to recreate in nature. Fortunately, nearby SRC Jarun is large and diverse enough [*place factor*] and well-equipped for various recreational and leisure activities [*purpose factor*]. Visitors can perform a plethora of different practices in a number of different ambients provided by the UGBS's design [*place and purpose factors*] and generate a myriad of benefits.

Recreationists in the Lower Town are not that lucky because parks there are relatively small [*place factor*] and their design reminds of their historical use [*past factor*], so they might be discouraged from *exercising* on the grass. If a park user who appreciates the history of the park sees that people are *cycling* over the Green Horseshoe lawns [*past* and *practices factors*], they might generate negative experiences. That would not be a problem in Savica and Newlyweds parks where such past factor is not relevant. Moreover, young families with children [*people factor*] in Savica or Siget/Trnsko will probably find grassy surfaces and children's toys [*purpose factor*] well-suited for children's play, but they might be embittered if dog walkers did not pick after their dogs [*practices factor*].

The examples above show how different factors provide conditions for and limitations to cultural practices in the same environmental space. As evident from the examples, not all factors are necessarily relevant and equally important in the same UGBS. The past factor seems much less relevant in Savica Park than in the Green Horseshoe, while SRC Jarun is large and diverse enough that relative importance of people factor there is much lower than in the pocket park intended primarily for the block residents. The 5P factors act synergistic, so in the end, only practices for which all relevant factors provide the favourable conditions will be able to happen and generate CEB. How pleasant the performing of practice and how intense the generated CEB will be depends on the conditions provided. Both

small and large parks can facilitate *sitting on the bench,* but the benefit of *tranquillity* will probably be more intense in a large park.

The example of Green Horseshoe indicates that not all factors are relevant to each individual: for park users who are not aware of or do not care for historical use, the past factor is irrelevant. In such instances, the planners' role is to 'juggle' with management options to provide both groups with opportunities for CEB generation. Nevertheless, if we are going to use UGBS to increase the urban population's contact with nature as a step towards urban sustainability (Andersson, Tengö, et al., 2015; Ives et al., 2018), we need planning and design to decrease negative experiences in UGBS. The notion of cultural ecosystem disservices is not unknown (Fischer & Eastwood, 2016; La Rosa et al., 2016). They may evoke adverse feelings such as sadness, disappointment or diminishing restorative function of UGBS (de Kleyn et al., 2020), which may have a repelling effect on park visitation. We strongly advise that increased attention is given to disservices in research and practice.

Application of the 5P framework in planning

Identifying and classifying CES and CEB using Fish, Church, and Winter's (2016) framework is the first step in understanding the generation of CEB from UGBS. Yet, if planners aim to provide spaces for urban nature that can reconnect urban residents to nature (Pyle, 1993), they must understand the *process* of CEB generation. Following the results obtained by applying the 5P framework in practice, we believe that it provides suitable means for decomposing that process and identifying locally relevant factors that govern it. The multi-factor perspective allows planners to systematically analyse how location (place factor), prospective users (people factor), their activities (practices factor), intended purpose of a UGBS (purpose factor) and its history (past factor) affect conditions in an individual UGBS for the performance of cultural practices and generation of CEB.

The 5P framework is applicable in different stages of UGBS planning and management process. It can provide invaluable input information for planning and design, and help monitor UGBS use and CEB generation in a UGBS. Repeated and continuous application of the framework in UGBS planning and management is supposed to accumulate locally-based knowledge and consequently improve the decision-making with each application. While the gained knowledge might not be directly transferable to other locations due to their distinctive configuration of the 5P factors, it can still give planners and decision-makers insights when compared with locally-relevant knowledge. Further research on the 5P factors should create a firm theoretical foundation on which practical guidelines can be based. Considering that the urban planners' main domain of influence is spatial features, we especially advise that research focuses on investigating the relationship between UGBS diversity (landscape, biological and geodiversity) and the number and type of practices occurring in them and the CEB that result.

On a more operational level, the 5P framework thrives with a multitude of data sources and methods, as shown in the findings. We combined interview and observation data to gain two data sets to inspect the same research subject (cf. Fish, Church, & Winter, 2016). In-depth analysis of partially mismatching sets of reported (24) and observed (16) practices indicated the prudence of combining methods. Observation yielded a more objective list of practices performed in a park as well as combinations of practices performed simultaneously (e.g. *strolling* and *babysitting*), but its deficiencies involved difficulty in identifying certain practices (e.g. *observing the surrounding* or *contemplating*) and detecting CEB, which are personal and may not be directly visible. These shortcomings were counteracted with interviews which, in contrast, could not detect all the cultural practices and benefits, but only those reported by the interviewees. We recognise that some users might receive certain CEB unconsciously (e.g. *knowledge acquisition* while *observing the surrounding*) and therefore not report it to the surveyors. On the other hand, when reporting, users seemed to leave out some practices or benefits often, focusing on the most prominent or obvious ones. For

instance, users tended to mention *sitting on the bench* but leave out accompanying practices like *observing the surrounding* or *dating*.

The research indicated that the specificities of the language need to be taken into account. The results indicate that people expressed some motivations as CES and some other as CEB because it was easier to express them that way in a particular language or it was a common expression in that language. For instance, it is more common and easier to say "dog walking" than "enjoying nature in a dog's company". Similarly, many participants reported *strolling* and *sitting on the bench* as motives for visiting UGBS, because these are common expressions related to the notion of the park that implicitly involves many benefits generated by performing these practices. This also shows how methods can influence understandings of concepts. The issue of language is not inherent to surveying data only but to reporting data analysis results as well. In this case, where we surveyed in Croatian but reported it in the English language, we deliberated on the translation of each respondent's statement to ensure the meaning is accurately communicated. For instance, we deemed *strolling* as a more accurate translation of Croatian word *šetati*, meaning 'walking in a leisurely way', than the term *walking*.

Apart from being an important factor within practices factor 'umbrella', the reported motivations for visiting particular UGBS proved to provide additional insights to CEB generated in UGBS. First, reported motives identified as CEB might inform the subsequent questions on generated CEB. Second, the fact that users mentioned particular CEB as motives for visiting UGBS suggests that they might be conscious of which practices will generate those particular benefits for them in a particular park. While we reiterate that CEB are person-based and that the same form of interaction with nature might not generate the same benefits for different people (Fish, Church, & Winter, 2016; Tandarić et al., 2020), this finding underpins practical knowledge of users which might be utilised in planning. Third, a lesson can be gained from the finding that, unlike other respondents, dog walkers and babysitters tended not to mention additional motives for visiting parks. There are two possible, mutually inclusive

explanations: (1) users might sometimes collapse together other practices and CEB with the main/obvious ones, and (2) these practices are primarily performed to benefit dependants (dogs/babies), not excluding benefits for dog walkers and babysitters too. According to the first explanation, the CEB they receive while performing those practices are almost implicit, suggesting that some UGBS users might use practices as a way of packaging up benefits when reporting their behaviour in UGBS. They might not articulate CEB like the pleasure of *dog walking* in particular environmental space or *escape*; however, these could be contributing to their motivation for those practices.

An important finding was that interviewees tended to report certain practices and benefits along each other repeatedly. *Escape*, *enjoying aesthetic qualities* of a park and *tranquillity* were often mentioned along with *health*, whereas *pleasure of spending time in nature* was often bundled with other practices (*strolling, sitting on the bench*) and benefits (*health benefits*, *attraction to spending time in nature*). Similar co-occurring pairs were found in Finlay et al. (2015) and Ives et al. (2017). The repeated co-occurrence of several ES across space is well documented in literature as 'ES bundling' (Saidi & Spray, 2018), however the examples above imply the possibility of not only bundles of CES and other ES but also bundles of CES and CEB (cf. Chan et al., 2011). Further research should address this issue as it might greatly benefit UGBS planning for CES.

Interactions with nature in socialist and post-socialist Zagreb

Most of the reported positive experiences originated from the socialist and most negative from the post-socialist period. Considering the finding that most adverse experiences involved others' practices, this might imply that the culture of spending time in parks changed since the socialist period. The reported fear of particular user groups might also indicate the change of visitor structure. However, studies showing that people are more likely to remember positive experiences that happened a long time ago and more recent negative experiences (Leist et al., 2010) should be taken into account. While our study aimed to better

understand the appreciation and use of UGBS and CEB generation in socialist and post-socialist contexts, interdisciplinary approaches that combine historical, political, geographical and psychological methods are needed to explore this further.

Early post-war papers in Zagreb stressed the importance of UGBS for a functional socialist city, shifting from decorative to social places (Fröhlich, 1949), which was the case in other socialist countries as well (Haase et al., 2018). Moreover, it coincided with greenspace permeating urban planning in the western world in the second half of the 20th century (Haase et al., 2017). New socialist parks (Savica, Newlyweds Park, SRC Jarun) were constructed with functionalist design adjusted to daily use by residents who spent half of the day at work (Drljević, 1976). The landscape design of parks facilitated a number of cultural practices that could be performed there. However, according to interviewees, Green Horseshoe, which was inherited from an earlier period, remained a predominantly decorative place with limited opportunities for closer interactions with nature.

In line with trends from the rest of the socialist world (Haase et al., 2018), many new parks in Zagreb originated in the socialist period. However, the funds for maintenance of these parks were often lacking. Interviewees gave varying responses regarding the quality and maintenance of parks in the case study neighbourhoods over time. Those in Savica generally thought that it either decreased or remained unchanged, while those in Siget and Trnsko mostly believed that it decreased since the socialist period. The landscape architect Halambek–Wenzler (1976) reported the under-maintenance of UGBS in socialist Zagreb, which was the case in some other European socialist cities too (Haase et al., 2018; Hirt, 2015). Participants' divided responses suggest that parks' quality and maintenance might have improved in some while worsening in other aspects.

The transition from the socialist to post-socialist regime brought a large change in the planning and management of UGBS, which reflected on their use. While socialist parks were established as a vital component of urban living space but were often neglected due to the lack of finance, their public role has been

subordinated to financial interests in the post-socialist period. UGBS have been considered underutilised spaces for future construction (Hirt, 2015; Krajter Ostoić et al., 2017). Central parks, such as Green Horseshoe, have been decorated and adjusted to the new type of users—tourist, as exemplified by recent decorations of Green Horseshoe, which did not conform to its historical use and evoked negative emotions among some interviewees. At the same time, remaining UGBS out of the centre have been systemically neglected and unadjusted to users' needs because they do not generate money. Their neglect is reflected in an increased number of unfavourable conditions for cultural practices and, consequently, limited CEB generation opportunities. Further research of planning, management and use of socialist and post-socialist UGBS in the context of CES provision should complement scarce information about socio-cultural benefits that residents of post-socialist cities can utilise and their influence on and role in UGBS governance.

Participants were disunited regarding the change in the frequency of visiting UGBS, although their responses shed light on the opposing vectors of the frequency. Technological development was a principal reason for those assuming decreasing trends, with media and gadgets occupying the time that residents used to spend in UGBS. Technology as a distraction from spending time in nature has been identified in Romania as well (Balázsi et al., 2019). Much more diverse but individually less supported reasons for increasing trend were increased awareness of healthy lifestyle which usually entails physical activity in urban nature, the claim that people used to travel outside of cities more often in the socialist period while now they use that time to frequent UGBS, and the increase in the number of parks. While there was no backup for the latter two reasons in the literature, Opačić et al. (2019) hinted that awareness of a healthy lifestyle in Zagreb might be increasing.

Conclusions

We found that cultural ecosystem services and benefits substantially motivate park users to visit and spend time in UGBS. Users may be attracted by the ambience of a park as well as obvious opportunities to interact with nature. This study showed that cultural ecosystem services and benefits result from the interplay between the 5P factors. Interaction with nature is a relational process in which the users invest their time and energy based on current mood, habits, past experiences, their values and attitudes and the meanings they attach to the place. All these personal factors interact with the place, its purpose, past, and the practices of other users. The results are self-tailored CEB (Tandarić et al., 2020), which in turn affect personal experiences from interactions with nature. If CES are to be translated into urban planning, planners should consider and seek to accommodate the unique idiosyncrasies of people, place, purpose, past and practices within particular UGBS as well as across an urban area.

Processing the results of CES assessment via the 5P framework yielded rich insights into how socio-cultural benefits of urban nature are generated. Qualitative data obtained through interviews enabled exploration of park use in Zagreb in the socialist and post-socialist periods through the lenses of 5P factors. While we assumed that CEB originate from cultural practices in interaction with environmental spaces (Fish, Church, & Winter, 2016), our study indicated that practices alone could not explain the whole sets of CEB that users reported to had generated in individual UGBS. This denotes the importance of other factors for their generation. Numerous topics arose from the interview data that were relevant for consideration within multiple factors. For instance, the Green Horseshoe design was considered under all five factors, yielding different aspects on the perception of parks and generation of CEB from each factor perspective. This reaffirmed the strong interconnections between the 5P factors, indicating that applying the 5P framework may help CES planning if the factors are approached as thematic guidelines rather than distinct categories.

By applying Fish, Church, and Winter's (2016) and Tandarić et al.'s (2020) frameworks, planners are equipped with practical tools for identifying CES and

CEB, revealing how and why particular cultural practices occur in specific environmental spaces, and understanding how cultural practices influence the generation of CEB. Planners can use this knowledge to manage those factors that fall under the planning domain to increase opportunities for diverse human–nature interactions (i.e. cultural practices) and therefore boost favourable conditions for the generation of CEB. Our findings implied certain connections between factor values and particular cultural practices and benefits; further studies and practitioners' experience could, perhaps, derive universal principles that could further aid planning for CES.

We have also shown how UGBS have been used in the post-socialist settings to generate CES and considered how this changed between the socialist and post-socialist periods. The socialist period produced landscape parks with diverse vegetation, which enabled various interactions of working people with urban nature. Yet, the funds for their maintenance were often lacking. The representational role of central parks changed little between the two periods: central parks in both socialist and post-socialist Zagreb were given priority in maintenance over peripheral parks. Although respondents thought that young people used UGBS rather less than in the past, parks originating from the socialist period remain the centrepieces of many neighbourhoods where modern children still "*do their first play*" (69/M/Savica).

The end of PAPER V.

6. "In the garden, I make up for what I can't in the park": Reconnecting retired adults with nature through cultural ecosystem services from urban gardens

"That's not a park, of course, but it's interesting how people appropriated greenspace; they keep themselves useful – in nature – and grow food. That's the best of both worlds."

Interviewed urban planner (71/M)

This chapter has been written as a research paper and submitted to *Urban Forestry and Urban Greening* in 2022.

In addressing the third research objective (*Identify patterns of and underlying motivations for the use of urban nature sites for the sake of eliciting CES*), this paper explores individuals' perspectives on CES by focussing on the perception, appreciation and use of urban nature. It complements the planned UGBS perspective of chapters 3 and 5 with that of non-planned UGBS to reveal how resident-designed sites of urban nature stimulate cultural practices and co-produce CEB. The diverse wild collective urban gardens that have existed in Zagreb for almost half a century are juxtaposed with city-provided collective gardens that appeared recently. Through interviewing retired gardeners, the motivations for urban gardening are explored and Fish, Church, and Winter's (2016) framework is used to help identify environmental spaces, cultural practices and CEB. Differences in the potential for wild and planned collective gardens to facilitate meaningful nature experience, stimulate diverse cultural practices and co-produce various CEB are outlined.

PAPER VI

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Status of the paper: **submitted to *Urban Forestry & Urban Greening***

Abstract

While cultural ecosystem services (CES) provided by collective urban gardens have been researched for more than a decade, how knowledge of CES can inform the governance of gardens and enhance gardeners' wellbeing remains a challenge. Retired adults are a group whose lives can be especially improved by collective gardening. We interviewed users of community and allotment gardens in Zagreb to establish their motivations for gardening and the influence of different forms of garden management on the generation of CES. Their responses were supplemented and contextualised by interviews with urban planners, academics and gardening activists. We used Fish, Church, and Winter's (2016) framework to identify CES in interviews. As expected, CES drove gardeners' engagement. We grouped their motivations into six categories: escape, usefulness and tradition, home-grown produce, socialising, wellness, and private oasis. Interestingly, food production was only of secondary importance as a motivator of urban gardening. Findings are used to outline recommendations for urban planners and decision-makers regarding planning, design and management of collective gardens that would amplify the generation of CES for retired gardeners.

Keywords: collective urban gardens, cultural ecosystem benefits, cultural ecosystem services, motivation, reconnection with nature

Introduction

Over the last two decades, practice and research of collective urban gardening have proliferated in Europe. In addition to allotment gardens, usually provided by municipal authorities, there is a proliferation of other forms of collective gardens arising from grassroots initiatives—community gardens (Dennis & James, 2017). In predominantly built-up urban areas, collective gardens are often green oases facilitating biodiversity and encounters with nature. But in contrast to most other types of urban green spaces where people are primarily consumers (e.g. parks and recreational grounds), collective gardens are also spaces of food production, place meanings and ambience (Atkinson, 2007). The benefits of collective gardens range from increased urban biodiversity, local climate regulation and stormwater infiltration (Guitart et al., 2012) to food security and contributions to gardeners' physical and mental health (Artmann et al., 2021). Social and environmental researchers increasingly assess those benefits using the ecosystem services concept that conceptualises how nature sustains and fulfils human life (Dennis & James, 2017).

Cultural ecosystem services (CES) entail ecosystems' contributions to human wellbeing that help enable the experiences, equip the capabilities and frame the identities of people engaging with ecosystems in some way (Fish, Church, & Winter, 2016). One of the main advantages of CES stems from their comprehensibility by laypeople. Unlike most other ecosystem services (provisioning, regulation and maintenance), CES can be perceived directly and experienced locally, irrespective of people's ecological knowledge or availability of measuring equipment (Andersson, Tengö, et al., 2015). For instance, gardeners might not be aware that gardens provide habitat for various plant and animal species (supporting services) or contribute to seed dispersal and pollination (regulating services) on the city level (Camps–Calvet et al., 2016), but they can directly perceive the therapeutic effect of spending time in the garden (Summers & Vivian, 2018) or a feeling of accomplishment when crops yield (Finlay et al., 2015). And indeed, research indicates that gardeners are aware of and value

contributions that correspond to CES more than other ecosystem services (Borysiak & Mizgajski, 2016; Robert & Yengué, 2017; Slavuj Borčić et al., 2016).

In contemporary urban sustainability discourse, CES' quality to be perceived and valued directly by users can be seen as a vantage point in combating various urban problems and endeavouring for urban sustainability (Klepacki & Kujawska, 2018). Indeed, industrial and post-industrial way of life has diminished urbanites' contact with nature leading to the increasing alienation from nature and declining care for its protection (Louv, 2008; Soga & Gaston, 2016). Researchers seek solutions to reverse that trend (Schuttler et al., 2018). It is well recognised that collective gardens can attract urban residents interested in more intense interaction with urban nature, which is crucial for fostering a meaningful connection with nature and care for its protection (Artmann et al., 2021; Lin et al., 2018).

Studies have shown that collective gardening is especially valuable for retired adults as it fulfils their free time, supports the family budget via gardening products, and greatly contributes to physical and psycho-social wellbeing (Finlay et al., 2015; Slavuj Borčić et al., 2016; van den Berg et al., 2010). Van den Berg et al. (2010) found that retired gardeners in the Netherlands experienced greater health and wellbeing benefits from gardening than their non-gardening neighbours in the same age category, and Slavuj Borčić et al. (2016) revealed that gardening could generate the feelings of usefulness that retired adults lost as well as community belonging. Considering the global trends of population ageing, the retired population will only increase over the following decades, especially in European countries (United Nations, 2019). If collective gardens can contribute to life satisfaction among older people and simultaneously contribute to reconnecting urban residents with nature, they have an important part to play as a public service provision alongside parks and recreation grounds.

Despite the proliferation of research on collective gardening (Bell et al., 2016), the generation of CES by collective urban gardens is still poorly explored (Cheng et al., 2021a), and consideration of CES in the governance of gardens (especially planning) is virtually untackled (for exceptions see Camps–Calvet et

al. (2016) and Langemeyer et al. (2018)). Further, we do not know enough about what motivates citizens to engage in collective gardening (Lee & Matarrita–Cascante, 2019) nor how such motivations relate to the CES provided by collective gardens. Consequently, the urban planners and decision-makers do not have relevant information that would help them shape effective policies to amplify the generation of CES in collective urban gardens to the scale of wider urban communities. This study explores retired gardeners' motivations for urban gardening and the cultural services and benefits they receive to advance knowledge that could enable scientists, planners, and practitioners to more effectively develop programmes and plans for collective urban gardens that meet the needs of retired adults.

The study is situated in Zagreb, Croatia, where collective gardening dates back to the 1970s. In order to address the diversity of collective garden forms, we compare practices of allotment and community gardening in Zagreb. The study is guided by the following research questions:

(1) What motivates use of collective gardens among retired adults?

(2) What is the relationship between use motivations and the CES derived from the gardens?

(3) Do different management regimes in collective urban gardens influence the provision of CES, and if so how?

(4) How can motivations for collective urban gardening be used to inform urban planning policies?

The CES framework

We use Fish, Church, and Winter's (2016) framework for assessing CES as it represents a useful model for comprehensively assessing CES while connecting to the existing well-recognised and widely used ecosystem services cascade model (Potschin–Young et al., 2018). The framework distinguishes different elements of the cascade—biophysical structures and processes in ecosystems

that underpin cultural services, benefits and goods. Discerning different elements of the CES cascade is crucial in planning because not all elements are (equally) plannable, and some non-plannable elements may be valuable indicators for planning (Tandarić et al., 2020). Fish, Church, and Winter (2016, p. 211) define CES as "relational processes and entities that people actively create and express through interactions with ecosystems". They appear in ecosystems as environmental spaces and cultural practices which enable and shape each other (Fig. 6.1). Environmental spaces are the spatial contexts in which human practices are performed. Practices may be performed as part of work, leisure, ritual, etc. and generate cultural alongside other ecosystem contributions. For instance, food produced in urban gardens is a provisioning contribution but may also be valued for its cultural dimensions such as connection with nature or accomplishment (cf. Urquhart & Acott, 2014). CES are thus often bundled with other ES, which reflects the plural values of human–ecosystem interactions (Kenter et al., 2019).

The interaction between environmental spaces and cultural practices may generate cultural ecosystem benefits (CEB), i.e. contributions to human wellbeing "in terms of the identities they help frame, the experiences they help enable and the capabilities they help equip" (Fish, Church, & Winter, 2016, p. 211). Human involvement is crucial in the generation of CEB as individuals engage in cultural practices according to personal preferences, desires, and needs. Their attitudes and emotional reactions to the interaction with an ecosystem mediate the generated CEB, which are therefore always personal (Tandarić et al., 2020). The human–ecosystem interactions may also produce exchangeable outputs (sometimes even in monetary terms) that can satisfy individuals' needs and thereby change their wellbeing (Church et al., 2011). These are ecosystem goods and can range from tangible outputs (such as food or ornaments) to intangible ones (such as the exhibition of food from gardens). When those goods help generate cultural benefits (such as life satisfaction or cultural identity), they are characterised as cultural ecosystem goods (CEG).

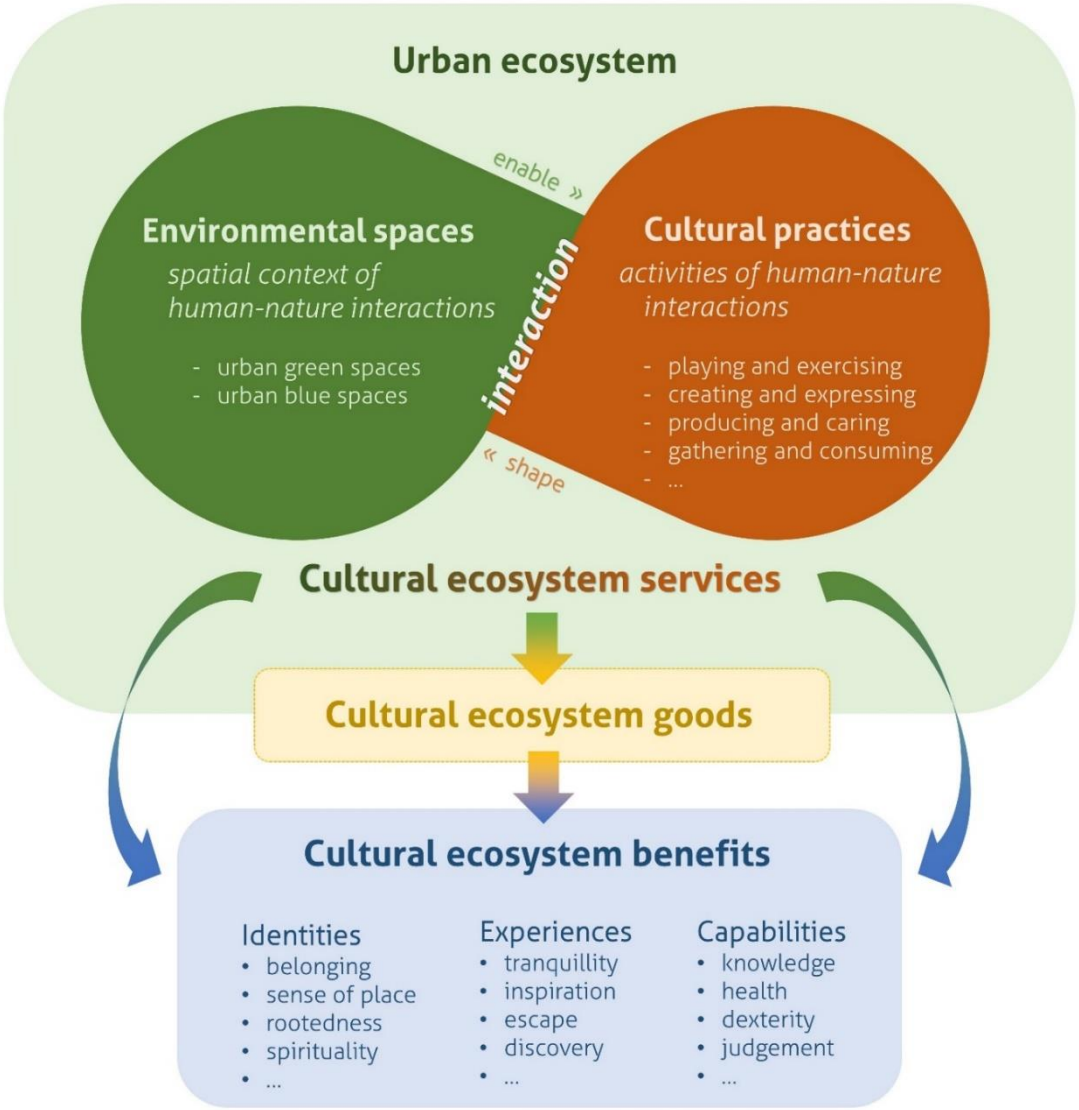

Fig. 6.1. CES research assessment framework, adapted from Fish, Church, and Winter (2016).

Collective urban gardens in Zagreb

The collective gardens in Zagreb originated in the 1970s on neglected city-owned lands in newly constructed neighbourhoods. Residents cleared the lands and laid out garden plots. Such gardens were illegal (and are referred to as *wild gardens* in Croatian literature), but the socialist authorities tolerated them due to the lack of funds for developing the occupied lands. Wild gardens represented a hybrid form of community gardens. They arose through grassroots initiatives on

city-owned land, and gardeners jointly installed and shared water pumps (Gulin Zrnić & Rubić, 2019). However, their structure consisting of 'private' plots and narrow public passages resembled that of allotment gardens, even though there was no authority that allotted the plots to gardeners. The plots are irregular in shape and size, and gardeners often constructed various simple structures there. Slavuj Borčić et al. (2016) found that rural incomers often created wild gardens during Zagreb's rapid socialist industrialisation, seeking links with an earlier rural way of life. Consequently, wild gardens are nowadays primarily maintained by pensioners.

Some wild gardens were removed in the post-socialist period due to private land development. One such event in 2012 attracted public interest, and a group of activists and intellectuals gathered in a civil initiative called Parkticipacija advocated the establishment of legal community gardens in Zagreb. Next year, the city administration initiated the City Gardens project, creating allotments and leasing them to interested citizens free of charge. The number of city gardens increased from five in 2013 to thirteen in 2019. In contrast to tolerated but illegal wild gardens, the formally created city gardens have attracted a more heterogeneous population in terms of age, education and family origins (Slavuj Borčić et al., 2016). Despite the project's immediate success and growing interest in gardening afterwards, the city authorities have resisted formalising them as a planning category, which would affirm their long-term survival.

Whereas wild gardens still exist across Zagreb territory, they have not been legalised nor incorporated into the City Gardens project. The exception is wild gardens in Savica, which were supposed to be removed in 2013. After the gardeners' protest, the mayor decided to incorporate them into the City Gardens network and expand them with new garden plots. The old gardeners have retained the right to keep their plots in the 'wild' shape but had to follow the formal procedure of obtaining the right to use plots. The heterogeneous structure of gardeners is reflected in the spatial structure of garden plots (Fig. 6.2).

Fig. 6.2. The area of Savica City Gardens with an approximate boundary of incorporated wild plots.

Materials and methods

Study area

Zagreb is the largest city and capital of Croatia. Its fast development is linked with socialist industrialisation (1945–1991), which attracted tens of thousands of rural incomers and induced rapid population growth (from 325,000 in 1948 to 707,000 in 1991). The undeveloped edges of new neighbourhoods often provided space for wild gardens. In 2019, the area of the city gardens network was 21.5 ha, whereas the area and number of wild gardens are not known.

We collected data from five case study neighbourhoods (Trnsko, Siget, Savica, Jarun, and Vrbani) selected based on their construction period. Trnsko and Siget are mid-socialist neighbourhoods constructed in the 1960s and 1970s.

There are three areas of unplanned gardens in Trnsko, one in Siget, and one area on the border between the two neighbourhoods, which we approach as a single case study unit. Savica Neighbourhood was mainly built in the 1970s and 1980s, and there is one formalised area of gardens. Finally, Jarun Neighbourhood has been built since the 1980s, with new housing estates being added over subsequent decades. There are two areas of unplanned gardens. In each of the three case study units, one or two garden areas were chosen as venues for interviewing gardeners (Fig. 6.3).

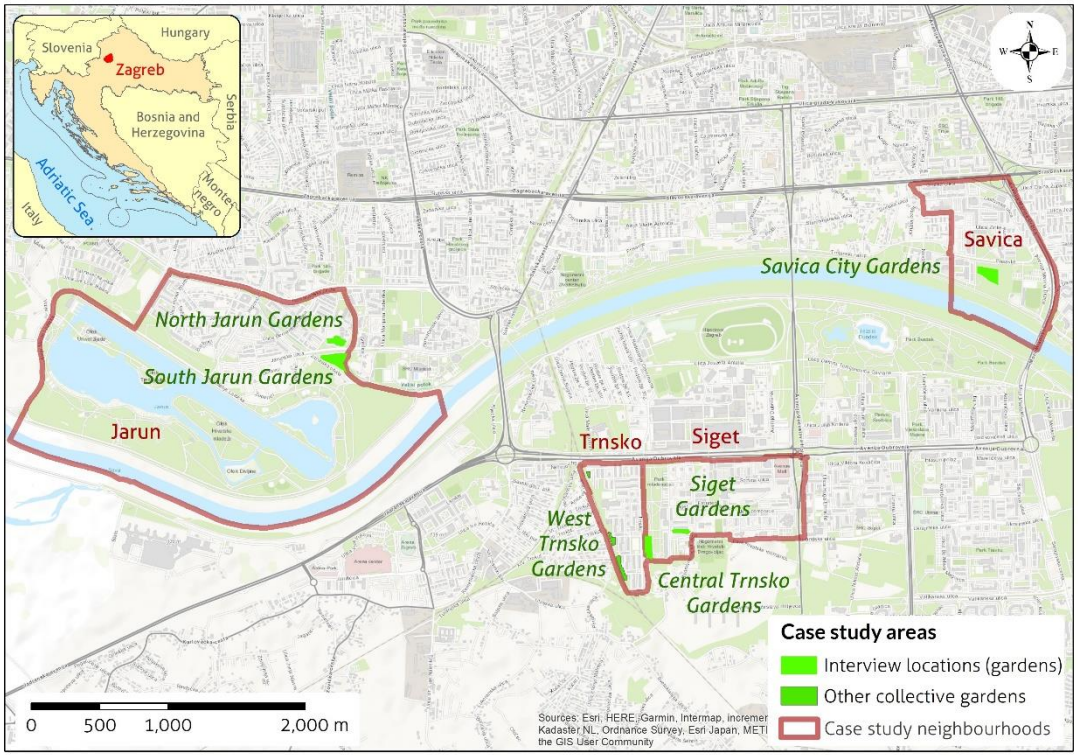

Fig. 6.3. Spatial distribution of case study neighbourhoods and collective urban gardens.

Data collection

Semi-structured in-depth interviews were conducted with gardeners and other relevant stakeholders between July 2019 and January 2020. Gardeners were approached purposively in selected case study gardens based on their age

and sex, but even representation of socio-demographic categories was not possible due to few gardeners being present in urban gardens and many individuals' unwillingness to participate. Many garden plots were not attended by gardeners during the days (in late August and early September) in which search for interviewees in gardens took place. In addition, due to their informal status (as documented previously by Biti and Blagaić Bergman (2014)), 'wild' gardeners were often suspicious of unknown visitors fearing the possible removal of their gardens and many refused to participate in interviews. We thus adopted an opportunistic model of seeking participants in gardens.

In addition, urban planners and decision-makers (hereafter: planners), academics from various disciplines, and activists for the protection of parks and gardens from land-use changes were interviewed to contextualise the findings with planning and management aspects. Planners and academics were identified within relevant literature and planning documents based on professional interest in urban green spaces and activity in two periods (socialist and post-socialist). Finally, activists were identified through analysis of media resources, and their sampling was guided by the following criteria: participation in actions and initiatives taking place in the case study neighbourhoods or legalisation of collective urban gardens. The final sample consisted of 10 gardeners (six 'wild' and four 'city' gardeners), 10 planners (5 active in both periods and 5 only in the post-socialist period), 8 academics (urbanism, landscape architecture, sociology, geography, ethnology), and 9 activists. All the gardeners were pensioners, with six female and four male gardeners. The response rate (the proportion of individuals who responded positively to being approached and invited to participate in an interview) was 66.7%, with more rejects by 'wild' than city gardeners approached. The other four cohorts' response rates varied from 38.5% among planners to 40.0% among academics to 69.2% among activists.

Distinct interview protocols were developed for: a) gardeners, b) planners and academics, and c) activists. The overarching topic was motivations for collective urban gardening, with subtopics referring to current motivations, drivers to begin gardening, and what gardening enables that other forms of

spending free time cannot. While questions varied in different protocols due to different levels of education, expertise and interests, they covered the same topics to maintain thematic consistency among participants. Interview protocols were structured and administered in a way to enable extending the discussion on any question/topic, which proved especially useful to gather in-depth data in questions matching respondents' experiences and/or expertise. Interviews were responded to verbally and lasted between 15 and 172 minutes, primarily dependent on the cohort, talkativeness and available time for conversation. The mean length was 53 minutes.

Data processing

Interviews were audio-recorded and transcribed verbatim in Croatian. The analysis was carried out in Croatian to avoid loss of meanings and subtle indications that could not be unequivocally translated into English. Data were analysed in the software package NVivo 12 with material organised by questions and cohorts. In the second stage, data were coded following Fish, Church, and Winter's (2016) framework. In the final stage, data were thematically organised into six motivation groups outlined through the critical deliberation on data. The data from interviews with gardeners served as a basis for grouping, whereas statements from other cohorts were used to complement and contextualise the findings.

Results

Motivations

Interviewed gardeners were keen to talk about various activities and contributions to their wellbeing that they generated in gardens. Analysing gardeners' narratives, we outlined six groups of motivations for engagement in collective urban gardening (Fig. 6.4). The underlying motivation—*escape*—is the need to get out of the flat and built environment, where gardens allow diverse

cultural practices and generate various CEB. Most gardeners stated this motivation along with one or more other motivations. Below we work out those motivations.

Fig. 6.4. Motivations for engagement in collective urban gardening.

Escape

When asked about the motivation for gardening, virtually all gardeners first expressed the need to get out of their flats. One gardener (64/F) from Trnsko depicted it as: "*I enjoy that I don't have much, but at least I can breathe here freely unlike in my small flat. You can't wait to escape from those catacombs.*" An interviewed academic geographer (38/F) recalled a response she got from one gardener to be: "*When I'm home, my whole body hurts because I stiffen in front of the TV. But when I come to the garden, I can shovel the whole day, and nothing hurts.*" However, for some gardeners, it is not only an escape from flats but from a conventional social environment as well. A gardener (71/F) from Trnsko thought, "*I would be within my four walls, peeking through the window to see who wears what kind of pants or shoes*" only to afterwards "*go for coffee and gossip with*

others". She continued: "*Here I don't care about anyone and no one cares about me and that feels great!*"

Although socialist neighbourhoods were designed in Corbusian style with plenty of greenspace surrounding buildings, they still recall the urban environment. One gardener (69/M) from Savica described it as "*I'm saturated with concrete. When you come here, it's five degrees cooler than in front of the building.*" For many gardeners, gardens almost entirely replaced parks for interaction with urban nature and they only cross them on their way to the gardens. A gardener (55/M) from Savica depicted that by saying: "*I frequent the garden and enjoy myself here. I'm 55; what would I do in the park?*"

The sentiments expressed by gardeners were somewhat echoed by interviewed professionals. One planner (53/F) thought that for many people, "*Gardens are an upgrade to the service of parks*" because they enable comparatively more activities and benefits and they can galvanise the sense of local community. An academic geographer (38/F) deliberated that "*in the park you go running—young people I mean—they will run, roll skate, cycle. But older people won't. That's why the recreation provided by gardens is important to them. Besides, gardens provide other benefits as well. When you run, you usually run alone, or cycle, but when you garden, different kinds of interaction develop among gardeners.*" One gardening activist (45/F) supposed that "*maybe in the garden, I make up for what I can't do in the park. I can't dive my hands into the ground, I can't plant and sow something.*" The interaction with nature is indeed strikingly dissimilar in parks and gardens.

Usefulness and tradition

Gardeners in Zagreb are predominantly pensioners left with plenty of free time, which gardening filled. Many of them reported that in gardens they feel useful again. After retiring, a gardener (71/F) from Trnsko found an occupation in the garden because "*I enjoy working!*" She added that "*I can't imagine, say, lying at home right now.*" Similarly, a gardener (55/M) from Savica thought "*you do*

some digging, make yourself useful" because "*there's nothing for you to do in the flat.*" The majority of interviewed gardeners were either incomers from rural areas or had firm connections with their rural families. A gardener (69/M) from Savica depicted how his origin shaped his need to be useful: "*I'm a rural child, and since I've known for myself, I was helping my mum and my grandma in the garden. I was never idle.*" Gardeners in Zagreb "*have deep roots and connections with their rural origin*", according to an academic sociologist (73/F) who thought: "*They just aren't the people who would go to the market and buy a kilo of tomatoes; it's nicer for them to grow tomatoes themselves.*"

Reminding them of rural tradition, gardens also help generate a sense of *place attachment* and *dependence*. One gardener (64/F) from Trnsko said that "*if they take it from us, they will take half of our lives.*" Another gardener (72/F) from Trnsko testified a *spiritual effect* she received in her garden: "*The very contact with earth drains negative energy.*" Whereas gardeners' responses only hinted at the links between rural tradition and greater connectedness with nature compared to urban lifestyle, planners, academics, and activists often referred to the human need for contact with nature. One activist (45/F) who actively gardens thought that in the past "*people were much more connected with nature and they actually lived surrounded by nature. So something draws us to nature—be that a garden or some other place. I think we are innate to be more surrounded with nature than the urban way of life enables.*"

Home-grown produce

Produce seems like an obvious provisioning service from gardens, but gardeners rarely referred to nutritional or financial dimensions of gardening. One gardener (70/M) from Jarun did state that "*for the whole summer I don't go to the market. We don't buy food because we have everything here.*" However, another gardener (60+/F) from Jarun demonstrated why financial relief is an improbable motivation: "*a kilo of our vegetables doesn't cost 20 kunas, that's cheap, it's worth*

300 kunas when you consider how much work we put in it"[10]. Moreover, a gardener (69/F) from Savica assessed that "*there are very few who garden because of the need*". The real reason outlined by several gardeners was the benefit of *pleasure* for not depending on the food market and knowing the origin of the food. A gardener (64/F) from Trnsko illustrated it well: "*I love everything home-grown and home-made. I dry the herbs because then I know what I use, what I consume.*" She went on proudly: "*Here's a cherry tree, I make cherry brandy for my husband, I make jams, all of that, and I like a cherry compote. And I know it's mine—I enjoy that.*"

Indeed, gardeners' responses tend to emphasise the cultural benefits (including the sense of *accomplishment*) of growing their own food over the functional ones. A gardener (69/M) from Savica said, "*Well, you get some satisfaction when… you see, two months ago there was nothing there, and now there are tomatoes, there are peppers…*" (Fig. 6.5). He rejoiced: "*And you take it home, and children and grandchildren say it's better than those from the grocery store. The little one says: 'That's the* real *tomato!'*" His garden-neighbour (70/F) concurred: "*I can't remember the last time I bought tomatoes. Lettuce also never. Once you know the difference in taste… you never [want to eat bought ones again]*". One planner (71/M) attested that "*When you talk to gardeners, they're so proud of their tomatoes, just as if they were the best in the world.*" However, wild and city gardens do not facilitate the generation of such CEB to the same degree. While fruit trees and bushes are frequent in wild gardens, they are not permitted in city gardens because they are allocated on a two-year basis. Gardeners from Savica, therefore, talked exclusively about vegetables.

[10] In 2019, 20 kunas equalled ca. €2.70; 300 kunas equalled ca. €40.00.

Fig. 6.5. A gardener's (69/M/Savica) gift of tomato, peppers, sage and rosemary to the interviewer (taken on 24/08/2019 by N. Tandarić).

Socialising

Socialising was a major motivation for engaging in collective gardening. Gardeners from wild gardens said that they had gardened "*mostly because of company we have here*" (60+/F/Jarun) or "*more for fun and socialising than for gain*" (72/F/Trnsko). An activist (55/M) who gardened corroborated: "*My main motivations were gathering and hanging around in the garden, plus I have a horticultural interest. So to me, it's not that important whether there are tomatoes, peppers, whether they are produced organically or not. I want that people feel good in the garden and want to hang around.*" Most wild gardens were complemented over time with various shade structures. A gardener (70/M) from Jarun said proudly: "*We built a gazebo where we have a table and chairs, we also have a barbeque.*" He asked: "*Why would we sit in the flat? We come here, invite neighbours, and we hang out, eat and have fun.*"

Indeed, socialising was regularly linked with consuming food in a company. A gardener (64/F) from Trnsko shared that "*I love to treat my good neighbours. We like barbecuing, treat ourselves, and drink coffee…*" Gardeners often installed barbecues in their wild gardens, whereas in the city gardens there is the common

space "*equipped with barbecues where fellow citizens hang around*" (54/M/planner). However, none of the gardeners from Savica referred to using the common space. Moreover, gardeners' responses suggested that wild gardens facilitated meeting other gardeners much better than the city gardens. A gardener (70/F) who created her garden plot before all the plots were incorporated into Savica City Gardens emphasised: "*We old gardeners all know each other.*" while another (69/M) said that new gardeners "*stick more to themselves*". One activist (45/F) who gardened in the wild garden interpreted that "*clearing and dividing the land and launching the gardens—that brought us closer.*" She continued that new gardeners "*did not have the experience of launching the gardens, and they did not consider the gardening community as something important; they just came gardening.*"

Another socialising activity reported among 'wild' gardeners was exchanging knowledge, ideas and skills. A gardener (72/F) from Trnsko described how "*If something succeeds in someone's garden, others would come and ask 'How it worked for you? It didn't for me' and so on.*" Then they would share what they did and learned with interested gardeners. Learning through gardening was usually mentioned in socialising rather than solitary contexts. Some gardeners mentioned teaching their children or grandchildren gardening and ecology-related knowledge. A gardener (70/F) from Savica City Gardens gave an example of her grandson who, by helping her in the garden, learned "*every plant, their names, what's poisonous, what's not poisonous, edible or inedible.*" Her garden-neighbour (69/F) thought that school children could be engaged in gardening and learn about nature first-hand.

Wellness

Various kinds of *health benefits* motivated gardeners to start gardening. One gardener (69/M) from Savica said that "*principally retirement encouraged me to start gardening. Look, health problems come primarily from sitting and inactivity.*" The therapeutic effects of gardening range from better somatic health due to

physical activities to psychological benefits, which one gardener (60+/F) from Jarun well depicted saying "*It's psychophysical relaxation. A person physically recreates, and that mentally calms them down.*" Whereas these effects were important for pensioners, war veterans who gardened in Savica City Gardens also leaned on them. One of them (55/M) said: "*I come here, rest my nerves for some time, then I barbecue some meat, call friends…*"

Several gardeners stressed that growing healthy vegetables is important to them. A gardener (64/F) from Trnsko stressed that she produced "*organic food. I'm cautious: I spray tomatoes only with diluted milk.*" An academic geographer (38/F) explained that "*they want it to be natural, to be sure that they eat healthy food.*" A gardener (70/F) from Savica said proudly that "*Our gardens are BIO. We don't poison plants with anything. We sprinkle them with nettle, comfrey, horsetail… We pick up the snails rather than using limacides which are among the deadliest poisons.*" Her garden-neighbour (69/F) followed: "*I pick a cucumber every day, wipe it and eat it with the skin. I'm not afraid because I know it wasn't sprayed with chemicals.*" A gardener (66/F) from Jarun complained, however, that some gardeners "*still spray plants*" and then "*wind drifts the droplets to our gardens*". Some academics warned about the locations of some gardens along roads, making them susceptible to traffic pollution. However, gardeners did not seem to worry much. One gardener (69/F) from Savica explained that they "*have those green barriers which somewhat protect gardens.*"

Private oasis

In search for respondents, the interviewer entered dozens of garden plots, each with its unique character. Rather than merely the farming units, wild and formalised garden plots were personalised, multifunctional private spaces, as a gardener (69/F) from Savica depicted it, "*organised so that we can come, relax… When not gardening, we can lay down on a deck chair, read and relax.*" She concluded: "*this is our tranquillity oasis.*" On top of valuing individual benefits that gardens and gardening provide them with, gardeners also value the

comprehensive character of plots that has originated through the continuous interaction between gardeners and place. They organise their activities in gardens to utilise the garden character they created. A gardener (71/F) from Trnsko described her afternoon: "*I'm here to do some gardening chores and to make myself an atmosphere for the evening. Between say 5 and 7 o'clock, I will sit down here, drink a coffee and enjoy the flowers.*" According to one gardening activist (45/F), that is the decisive advantage of gardens over parks: "*I can shape my garden the way I want whereas I get the park the way someone else designed it.*"

The interaction between gardeners and their gardens does not result only in the unique ambiences of such 'private oases', but also in benefits such as strong *place attachment*. A gardener (64/F) from Trnsko attested: "*When someone says: 'Why do you need that?'… Why, it's beautiful when everything is neat, and you come here, sit down, and watch it growing… That means everything to me.*" Another gardener (69/F) from Savica emphasised that her garden allows her to "*get out of the house, to do something, to be physically active… it's a delight above all to have such place completely for yourself!*"

The feelings of privacy and possession of such space are inherent features of wild gardens where individual plots are enclosed with high, screening fences (usually hedgerows), and those who own the plots can plant trees and shrubs. In the city gardens, however, plots are separated by paths and wire fences (Fig. 6.6). Furthermore, planting trees and shrubs as well as building structures and barbecues is prohibited in city gardens because, as one planner (53/F) stressed, "*gardeners sign a two-year contract for leasing plots after which they have to re-apply.*" She continued: "*Sometimes they do it self-willed, but it looks terrible and then we ask them to remove it.*" The old gardeners in Savica City Gardens successfully fought to preserve plots as they were before formalisation, but the new gardeners cannot enjoy privacy, and for them, a 'private oasis' can hardly be a motivation for gardening.

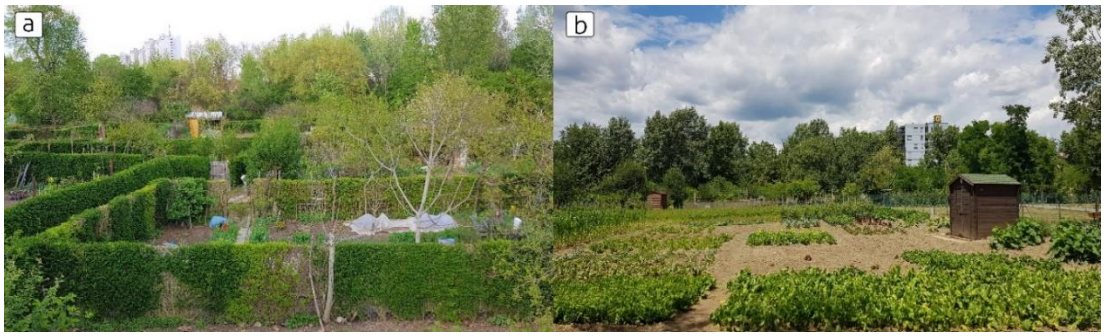

Fig. 6.6. Garden plots in a) wild gardens in Jarun and b) Savica City Gardens (taken in July 2019 by N. Tandarić).

Organising gardeners' motivations using the CES framework

Interview statements were processed through Fish, Church, and Winter's (2016) CES framework to translate gardeners' motivations into cultural services, benefits and goods. We identified four different environmental spaces, ten cultural practices, twenty CEB and at least two CEG (Fig. 6.7). How respondents talked about gardens (environmental spaces) and gardening (cultural practices) emphasised their relational character. Garden plots were referred to as "pleasant place", "tranquillity oasis" or "place completely for yourself", implying the personal relatedness with it as well as contributions to one's feelings and wellbeing. Cultural practices were mentioned in a similar way: "*I dry the herbs because then I know what I use*" or "*A person physically recreates, and that mentally calms them down.*" In these examples, gardeners value the very practices and spaces for the contributions they generate for them, and thus they maintain those spaces and perform practices.

Both environmental spaces and cultural practices were often coupled in statements with one or more CEB. Such interweaving suggests that gardeners might have learned which CEB will be generated from coupling a particular practice and an environmental space. Moreover, gardeners reportedly shaped their related gardening practices to ensure the generation of *food safety assuredness* and organised/equipped their plots to facilitate *relaxation*, *intimacy* and benefits of socialising. Finally, gardeners reported flowers and produce,

which correspond to provisioning ecosystem goods. However, the contexts in which those goods were mentioned reveal their cultural dimension—they were produced not for their nutritional and financial but cultural contributions to wellbeing, including the sense of *accomplishment* and *independence of the food market*. The interview statements suggest that CEG symbolise gardeners' effort, achievement in terms of growing a flower or vegetable from the seeds, and a certain independence from the grocery shops.

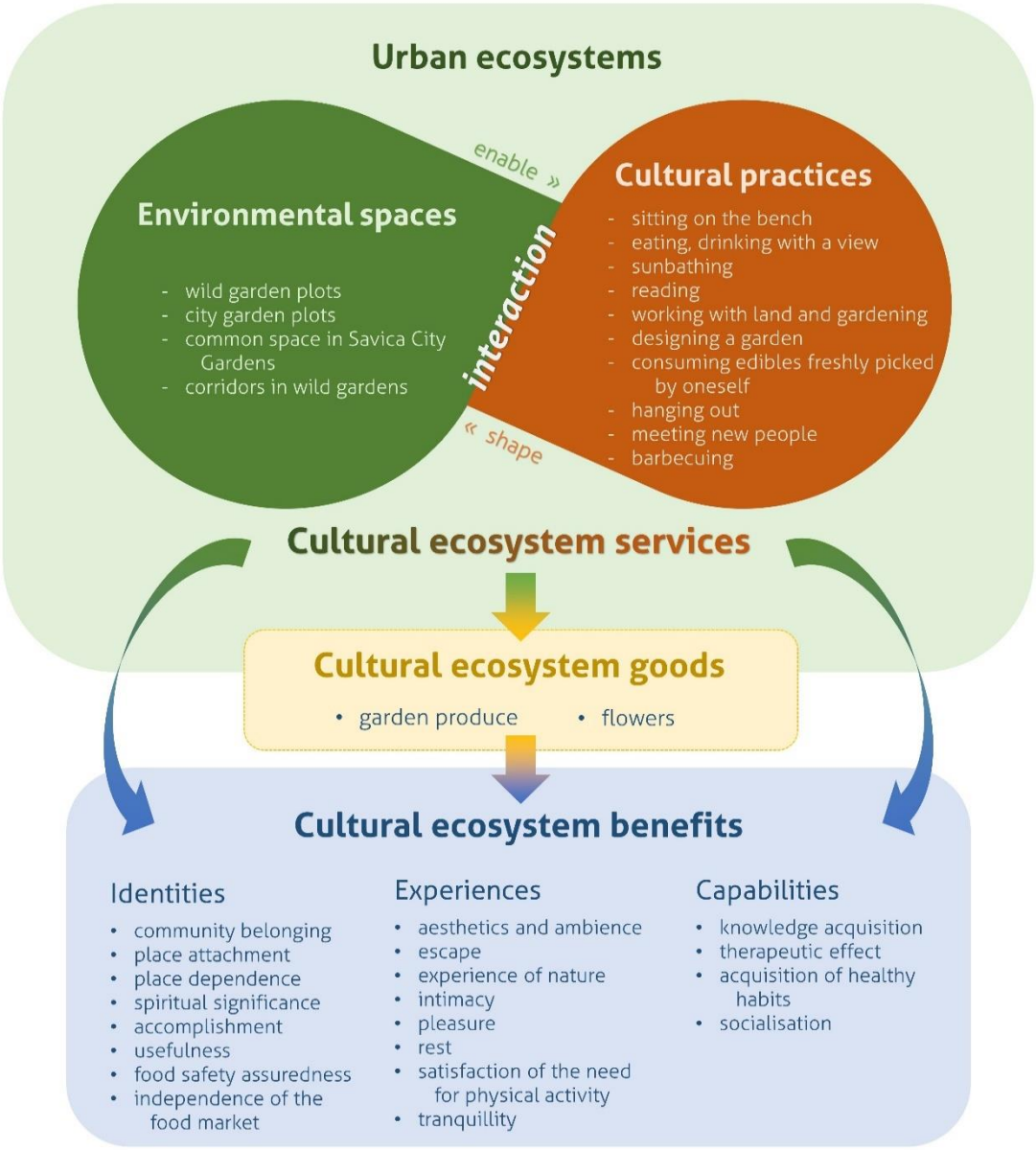

Fig. 6.7. Identified CES using Fish, Church, and Winter's (2016) framework.

Discussion

Multiple motivations for collective gardening

We identified six groups of motivations for collective gardening. Their common features are: (1) they are not mutually exclusive, and (2) they all pertain to cultural contributions to gardeners' wellbeing. Each gardener reported motivating practices and benefits from at least two motivation groups, whereas some reported practices and CEB from all six groups. Interestingly, gardeners rarely talked about classical gardening activities such as digging or planting, and when they did, it was usually to provide a context for generated benefits. In the same manner, produce and flowers were rarely mentioned for their financial and nutritional contributions, but more often for the CEB they generated, corresponding with an earlier study by Slavuj Borčić et al. (2016). This contrasts findings from some other post-socialist countries, such as Bulgaria and Romania, where collective gardening represents a survivalist strategy of the most impoverished urban dwellers (Alber & Kohler, 2008). The significance of cultural over provisioning contributions of gardens seems to date back to the socialist period when collective gardening in Zagreb originated as a continuation of the tradition and learned way of life rather than the need for nutrition (Slavuj Borčić et al., 2016).

The outlined motivations generally correspond with those found in other studies conducted in western cities: reconnection with rural tradition and nature (Armstrong, 2000; Langemeyer et al., 2018; Sonti & Svendsen, 2018), home-grown produce (Ruggeri et al., 2016; Scheromm, 2015; Sonti & Svendsen, 2018), wellness (Armstrong, 2000; Glavan et al., 2018; Ruggeri et al., 2016; Sonti & Svendsen, 2018) and socialising (Glavan et al., 2018; Sonti & Svendsen, 2018). We also found escape and private oasis to be major motivations, despite these themes having received less attention in the literature. An exception is Hanson et al. (2021), who found that some gardeners in Lund, Sweden, experience family gardens as "private retreat" places, whereas escape was found as motivation for visiting parks to escape from flats and stressful environments (G. Brown et al., 2018; Chiesura, 2004). We can speculate that many gardeners in Zagreb would

resort to parks if there were no collective gardens. Gardeners' responses illustrated that gardens represent an alternative to parks for many of them by facilitating different kinds of physical activities than parks and providing different opportunities for contact with nature.

Suitability of CES framework

Fish, Church, and Winter's (2016) CES framework successfully captured the different elements of the CES cascade—services (environmental spaces, cultural practices), benefits and goods—from motivations for gardening reported in interview transcripts. Whereas environmental spaces and cultural practices have physical reflection and could therefore be more easily comprehended and captured by the framework, the same is not valid for CEB. While categorising the reported CEB was attempted, their relational evolution made them subtly multifaceted and consequently more diverse than the vocabulary could capture. This pertains both to the limitations of everyday language among gardeners and the vocabulary of the CES framework. For instance, most respondents talked about socialising through cultural practices, but from their statements' broader contexts, we could glimpse which benefits were generated from those practices. Moreover, implied benefits of socialising could be read through *community belonging* (contribution to identity), *knowledge acquisition* (contribution to capabilities), *feeling less lonely* (temporary experience but may also be a contribution to identity if a person is friendless), and for some gardeners through more than one of those CEB (cf. Fish, Church, & Winter, 2016).

The demonstrated awareness of CEB generated in collective gardens and reported CEB such as *escape*, *experience of nature*, *place attachment*, *spiritual significance* and *food safety assuredness* indicate that gardening likely leads to increased affinity for nature and pro-environmental behaviour that researchers call for as the means of combating urban alienation from nature (Ives et al., 2018; Soga & Gaston, 2016). Even if gardeners are not aware of the strictly ecological contributions of gardens, such as air purification or habitat provision, they care

for gardens because of CEB, which they can perceive and receive (Andersson, Tengö, et al., 2015). The provision of gardening opportunities might therefore be a desired endeavour in contemporary urban planning as well as one of the pathways towards urban sustainability.

The context in which flowers and gardening produce (identified as CEG) were mentioned suggests that those can at the same time have nutritional and/or financial importance and cultural meaning, which was often emphasised over the former. The relevant interviews statements indicated that CEG in a way materialise the relational value of human/gardener–ecosystem/garden interaction, symbolising the values of both invested into and received from the interaction. Moreover, the materialisation of the relational value implies a certain continuance. For instance, CEG, such as ripened tomatoes, may help generate a sense of *accomplishment* (i.e. CEB) in the ripening season, but they can also serve as emblems of human–nature interactions and help re-generate that CEB at a later time. In addition, tomato chutney made out of those tomatoes can invoke the sense of *accomplishment* and *independence of the food market* in the winter, even far from the garden.

Hence, gardening CEG are valued as both gardening products and carriers of benefits. However, the CEB-carrying property is mainly linked with its producer, and it dissipates or may even disappear when the CEG is transferred to another person. For instance, a person receiving a tomato may value it for being produced organically but may not receive the benefit of *accomplishment*. CEG are rarely mentioned in the literature (e.g. Church et al., 2011) and represent an area for further research. The literature on the cultural, social, psychological and physical health benefits derived from home food production might provide valuable input into understanding CEG.

Recommendations for urban planners and decision-makers

Humans have a strong affinity towards nature and seek contact with it (Wilson, 1993). In that context, the built and social environments of

contemporary cities may seem overwhelmingly unnatural and stressful. While urban parks and forests may be obvious retreat choices, some citizens of Zagreb (but also Lund, Sweden, according to Hanson et al. (2021)) choose gardens over those. Given that no single solution will work for everyone, providing diverse opportunities for interaction with nature in cities may better target urban populations' diverse preferences and needs (cf. Tandarić et al., 2020). Collective urban gardens represent an excellent option in such an endeavour. However, for collective gardens to provide a functional alternative for human–nature interactions to conventional parks, planners should accentuate their contributions to human wellbeing.

The long existence of wild gardens and reported steadfast demand for city garden plots indicate a strong interest in collective gardening in Zagreb, whereas an increasing number of gardening studies suggests that this is true globally. Respondents in this study demonstrated the preference for gardens over parks precisely because they facilitate different kinds of engagement with nature. Therefore, there is an opportunity for planners to use the interest for the collective urban gardens to foster reconnection of urban population with nature and advance efforts to achieve urban sustainability. Our analysis identified certain disparities between Zagreb's forms of community (wild) and allotment (city) gardens that affect the generation of CEB. Whereas each form has its distinct history and users, the planning and design-relevant features of a hypothetical hybrid of these two forms are discussed below. Policy recommendations are presented in three domains: promotion (how CES can be used to promote collective gardening and attract retired adults to use collective gardens), design (what collective garden design solutions can enhance the generation of CEB and contribute to the wellbeing of retired adults), and management (how CES can facilitate and advance the management of collective gardens).

In outlining the policy recommendations, we followed the premise that CES emerge from an interplay between people and places (Raymond, Giusti, et al., 2017). In practice—and this was supported by the comparison between wild and

city gardens in Zagreb—this means that providing green spaces such as urban gardens may not be enough to encourage meaningful and lasting human–nature interactions nor elicit the generation of CEB. Indeed, the provided spaces should support diverse practices people would engage in. Hence, the recommendations below aim to direct decision-makers towards better facilitating the interplay between people and places.

Promotion-related recommendations

Retirement often brings a fundamental lifestyle change and unlocks much free time to be filled with new activities. The therapeutic effect of gardening and acquisition of healthy habits such as regular physical activity, daily breaks from stressors, or replacing sweets with seasonal fruits and vegetables may attract retired people to engage in collective gardening (van den Berg et al., 2010). In more general terms, the therapeutic effect of gardening can contribute to public health in cities, thus decreasing personal and public financial expenses for healthcare (Young et al., 2020). Additionally, an example of war veterans suffering from PTSD using gardening as therapy outlines it as a low-cost alternative to conventional medical treatments (Anderson, 2011). The so-called "green prescriptions" are increasingly studied and suggested as a means to support mental health (Van den Berg, 2017).

Furthermore, with pensions often smaller than salaries, retired people have lesser financial opportunities for many urban activities. The sense of usefulness provided by collective gardening can hence be a significant pull factor, while its output can also contribute to retired households' budgets. Finally, the opportunities for socialising may be a decisive factor in attracting retirees to urban gardens. As the modern lifestyle breaks the connection with nature, it also breaks neighbourly connections, and after retirement, people often suffer from loneliness (Beridze et al., 2020). Opportunities for socialising and meeting new people reported by gardeners in Zagreb attest to the social role of collective gardens for retired adults.

Design-related recommendations

The structure of city gardens clearly promoted food production over other activities, despite the finding that ensuring nutrition and financial relief was only ancillary to cultural contributions of gardening. Acknowledging that this might not be the case in many cities (Alber & Kohler, 2008; Scheromm, 2015), collective gardens should integrate food production with opportunities for diverse social activities and interactions with nature that would enable the generation of valuable CEB. Considering that interviewed gardeners cherished opportunities for home-grown produce, privacy and socialising, it was evident from this study that trees, shrubs and hedgerows in wild gardens facilitated those opportunities. Fruit trees and bushes in collective gardens could expand the range of produce and CEB generated while nurturing, picking, processing and consuming fruits. Even if garden plots are allotted for a fixed period without certainty that the contract will be renewed, the offered plots could vary in terms of containing perennials, and applicants could choose between plots with and without fruit trees and shrubs.

The conveyed testimonies suggest that trees with shade-providing canopies within or in-between garden plots greatly increase both socialising and other beneficial activities such as sitting in the shade, resting or reading. Indeed, gardens are an excellent arena for meeting other retired gardeners and developing friendships, which Kingsley et al. (2020) found would not have evolved outside of gardens. Socialising in the garden under the tree may represent an alternative to retired adults' loneliness in flats or parks (van den Berg et al., 2010). Relatedly, simple structures such as gazebos and barbecues were repeatedly linked with socialising and pleasure in interviews. Their inclusion in garden plots might greatly increase the generation of benefits of socialising. Indeed, trees, shrubs, gazebos and barbecues transformed wild garden plots from merely farming units to multifunctional spaces that gardeners chose over flats and parks when it came to free time.

The study illuminated the role of hedgerows between garden plots, which facilitated more intimate socialising but also various solitary practices that

generate a sense of escape, relaxation from stress, and tranquillity (Gulin Zrnić & Rubić, 2019). Hedged wild garden plots reportedly better accommodated the gardeners' need for expression than city garden plots whose soft boundaries (paths and transparent wire fence) do not provide privacy and intimacy. 'Wild' gardeners appreciated the opportunity to adjust the plot to create a particular ambience for preferred practices and CEB, which is aligned with the relational character of CES generating personal CEB (Fish, Church, & Winter, 2016; Tandarić et al., 2020). Such intense interactions with nature create strong bonds between gardeners and their plots, which are recognised as place attachment and place dependence (G. Brown & Raymond, 2007).

Louv (2008) emphasised that place attachment and dependence are among essential means for creating and facilitating connection with nature and care for its protection. From that point, offering both plots with hard (e.g. hedgerows) and soft (e.g. paths, transparent wire fences) boundaries might diversify the plot selection and the generation of CEB. Moreover, if monitored, such a division may provide valuable comparative insights for planners and decision-makers regarding the generation of CEB and demand for certain types of plots in local conditions. Not less important, natural elements in urban gardens would also provide other ecosystem services such as local climate regulation, air filtration and provision of habitat for urban wildlife (Cabral et al., 2017), even if those are not widely recognised by gardeners (Andersson, Tengö, et al., 2015).

Management-related recommendations

While food production did not decisively motivate collective gardeners in Zagreb, they expressed aspirations and desires for organic farming that ensures independence from the food market and safe food. Garden planners and managers should adopt the organic farming policy as well as ensure that gardens are protected from other urban sources of pollution such as traffic and industrial gases that may impair food safety (cf. K. Brown & Jameton, 2000). High hedgerows encircling wild gardens in Zagreb might provide natural protection

while delivering multiple other ecological and socio-cultural benefits (Montgomery et al., 2020).

Gardeners pointed out a significant and often untapped potential for formal and informal environmental education. When retired adults engage in gardening, they might need introductory training or peer-mentoring to start farming. Within the City Gardens project, workshops and training for gardeners are organised, and a gardening manual is made available for them (Mrakužić, 2018). Such an approach could help beginners in gardening and adapting to collective activities and already participating gardeners to advance their knowledge and skills. The successful fitting into the collective gardens, interaction with the soil and plants, and implementation of environment-friendly practices will likely strengthen the connection with nature and its considerate use (Scheromm, 2015; Teuber et al., 2019).

The collective gardens may also provide learning opportunities for children. Some gardeners in our study illustrated how children engaged in gardening may acquire valuable knowledge about nature. One gardening activist (45/F) well depicted the learning benefits for children: "*When they come to the garden, they can watch the whole process—when they plant something and then watch it grow, they react with 'Wow, I grew lettuce myself!' It's important to transfer such knowledge to children*" so that "*they don't think everything can be bought in a store. Food doesn't grow in stores.*" Indeed, if gardens are used to provide children with a place to play or teach them about food production, this might counteract the extinction of experience and lead to a new generation of urban citizens interested in natural processes (Louv, 2008; Teuber et al., 2019). Moreover, such activities may lead to inter-generational connections to place. Hence, the learning opportunities should be considered when planning collective gardens.

The distinctive way gardeners care for gardens is shaped by the character and intensity of interaction with nature in gardens and the generated CEB. Wild gardens' long existence and functioning in Zagreb indicate that gardeners are enthused stewards, responsibly using, managing and caring for gardens through sustainable practices. This suggests that the environmental stewardship concept

could be incorporated into the management of collective urban gardens (Langemeyer et al., 2018). On the other hand, gardeners' comprehensibility of CES can serve as a form of real-time 'monitoring' of the state and health of the ecosystem as gardeners would quickly register if the generation of usual CEB changes or disappears (Andersson, Tengö, et al., 2015). The joint stewardship of gardens might also strengthen the sense of social cohesion and community belonging, which weaken in modern cities (Slavuj Borčić et al., 2016).

Conclusions

Collective urban gardens are a distinct type of urban green space that require different forms and intensity of engagement from traditional parks. Yet, they also offer opportunities for the generation of different sets of cultural benefits. By supplying various CEB, including the sense of usefulness in return for direct contact with urban nature, collective gardens indeed can fulfil the retired adults' lives and reconnect them with nature. This study explored the motivations for gardening among retired adults in Zagreb to contribute to shaping effective plans and policies for collective urban gardening and better generation and utilisation of contributions to gardeners' wellbeing. Six motivations were identified: escape, usefulness and tradition, home-grown produce, socialising, wellness and private oasis. Food production was overshadowed by multiple other socio-cultural practices and benefits, suggesting that motivations for and benefits of the practice of gardening are highly significant and need to be front and centre in any planning and management activity (not just the spaces and behaviours of gardening).

Fish, Church, and Winter's (2016) CES framework proved suitable and helpful in capturing motivations for collective gardening, outlining diverse elements of the CES cascade. It captured the relational character of cultural practices for which gardeners valued them as well as a variety of cultural benefits and goods that improve their wellbeing. However, it also indicated complexities and relationalities that do not always fit neatly into the framework structure. The

performance of cultural practices and the generation of benefits was considerably influenced by the different management regimes of wild and city gardens. The spatial structure and composition of wild gardens (including trees, hedgerows, and simple built structures) facilitated different and diverse cultural practices and resulting benefits that city gardens could not provide. On the other hand, the city gardens provided better learning opportunities and ensured food safety. Following the revealed motivations and different effects of the two management regimes on the provision of CES, recommendations were provided for urban planners and decision-makers in terms of promotion of collective gardening among retired adults, garden design and management for amplifying the diversity of cultural practices and benefits and better inclusion of gardeners through the environmental stewardship. We believe that the recommendations would contribute to building urban resilience in socio-economic and ecological terms (Langemeyer et al., 2018), reconnecting urbanites with nature, and consequently achieving urban sustainability.

We emphasise that no recommendation is universally applicable as the local specificities of each city and each local community may dictate the suitability of particular solutions. Furthermore, our recommendations are generalised for a hybrid of allotment and community gardens that would amplify cultural services and benefits. Since there are thousands of existing allotment and community gardens worldwide, some recommendations may be applied to them only partially or with certain adjusting. While this study targeted retired adults, further research focused on other age/employment cohorts may upgrade the recommendations and encourage the broader urban population to garden and experience CEB more directly and possibly participate in environmental management (Teuber et al., 2019).

The end of PAPER VI.

7. From city in the park to "greenery in plant pots": The influence of socialist and post-socialist planning on opportunities for cultural ecosystem services

"One of the most important inspirations for Yugoslavian architects was Le Corbusier's Unite d'Habitation, and by the end of 1950s virtually every major city had at least one recognizable Corbusian structure, with leading examples in Belgrade and Zagreb."

Maja Babić (2013, p. 79),
architectural historian and critic

This chapter is written as a research article and it is currently under review in *Land Use Policy*.

This paper aims to determine the extent to which socialist and post-socialist urban planning facilitated the provision of cultural ecosystem services in Zagreb and identify the underlying reasons. By combining content analysis of socialist and post-socialist urban plans with interviews with planners and academics, the chapter investigates how plans for UGBS enabled the performance of cultural practices from which CEB can arise. The 5P framework is used to structure the content analysis, allowing determination of the plans' agency in each 5P factor. The paper identifies the major elements in which the influence of planning systems on the opportunities for CES provision differed and outlines insights for practitioners.

PAPER VII

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Status of the paper: **under review in *Land Use Policy***

Abstract

There have been few studies of planning aspects of cultural ecosystem services in East European socialist cities. This paper examines the extent to which cultural ecosystem services were considered in urban planning in socialist and post-socialist Zagreb. We conducted a content analysis of three socialist and two post-socialist plans of Zagreb and interview transcripts with urban planners and academics. To take account of the relational character of cultural ecosystem services, we assessed the extent to which urban planning facilitated the opportunities for human–ecosystem interactions rather than individual cultural ecosystem services themselves. The findings indicated that socialist planning facilitated interaction opportunities to a wider extent than post-socialist planning. The paper examines the links between the cultural ecosystem services concept, political ideologies and urban planning.

Keywords: cultural ecosystem services, post-socialist regime, urban green and blue spaces, urban plans

Introduction

Ever since the Millennium Ecosystem Assessment (MEA, 2005), researchers have attempted to translate the ecosystem services (ES) concept into practice. Yet, understanding, assessment and instrumentalisation of ES in planning continue to face difficulties (Grunewald et al., 2021; Kabisch, 2015). The resistance of some types of ES, especially cultural ecosystem services (CES), to quantification and monetisation hinders their integration in planning (Grunewald et al., 2021) and makes the ES assessment incomprehensive by addressing only measurable services (Martin et al., 2018; Milcu et al., 2013). The process is further inhibited by the increasing popularity of related concepts such as nature-based solutions, nature's contributions to people, landscape functions and green infrastructure (Grunewald et al., 2021; Radford & James, 2013). Nevertheless, many ES, despite not being labelled as such, have been included in contemporary and historical urban plans of many cities around the world, including Berlin, New York, Stockholm, Melbourne, and Italian and Portuguese cities (Cortinovis & Geneletti, 2018; Geneletti et al., 2020; Mascarenhas et al., 2015; Rall et al., 2015; Wilkinson et al., 2013).

Recreation was the most common CES dealt with in these plans. This is because recreation is easier to map and measure than most other CES (Chan, Satterfield, et al., 2012; Cooper et al., 2016) CES other than recreation are often treated as a residual category in ES assessments, after accounting for other services (Huu et al., 2018). Understood broadly as nonmaterial nature's contributions to human wellbeing, CES resisted for a long time the submission to the widely accepted ES cascade model (Haines–Young & Potschin, 2010), which conceptualises the service production process as a cascade starting with biophysical structures and processes which produce services that sustain human life and generate contributions to human wellbeing (benefits). Benefits shape cultural values, which in turn influence human–ecosystem interactions. Consequently, studies often failed to discriminate between cultural services, benefits and values (Blicharska et al., 2017), which obscured the CES provision

process (Fish, Church, & Winter, 2016) and sometimes led to double-counting (Hernández–Morcillo et al., 2013).

Clearly, human involvement in the production of CES is indispensable (Chan et al., 2011; Fischer & Eastwood, 2016). In an attempt to relate CES to the ES cascade model, Fish, Church, and Winter (2016) proposed that CES are understood as "relational processes and entities that people actively create and express through interactions with ecosystems" (Fish, Church, & Winter, 2016, p. 211) (Fig. 7.1). These are represented by mutually reinforcing cultural practices (forms of interactions, e.g. recreation, observing) and environmental spaces (spatial contexts of interactions, e.g. park grassland, riverbanks). The interactions may result in contributions to human wellbeing in terms of "the identities they help frame, the experiences they help enable and the capabilities they help equip" (Fish, Church, & Winter, 2016, p. 212). The contributions correspond to the level of cultural ecosystem benefits (CEB) in the ES cascade model. The utility of this framework for land use policy is that it distinguishes between plannable, material elements (spaces and practices) and non-plannable, immaterial components (benefits).

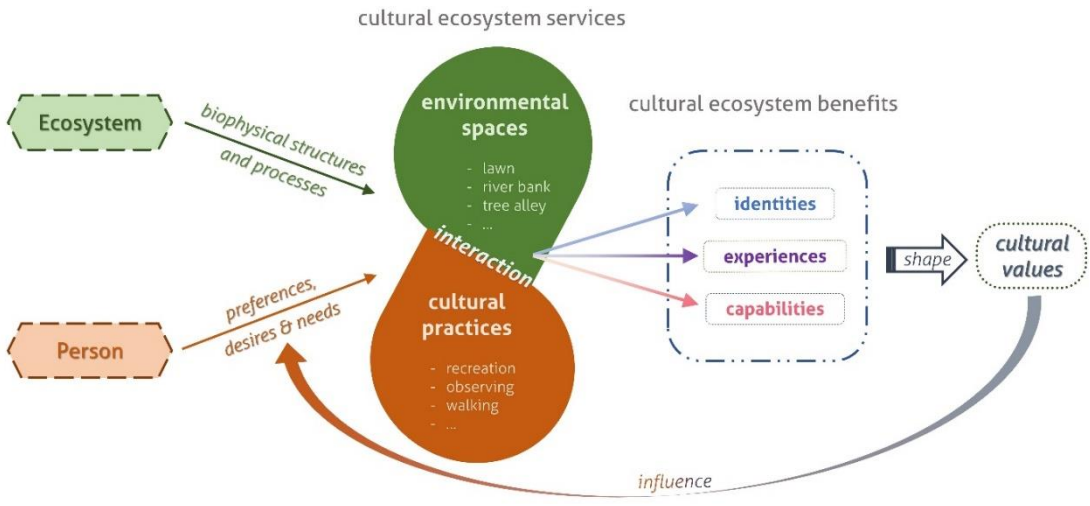

Fig. 7.1. The CES cascade modified from Fish, Church, and Winter's (2016) framework.

To help translate this model to planning, Tandarić, Ives, and Watkins (2020) proposed the "hatch and grow" strategy for planning for urban CES, which recognised that many of the benefits derived from urban nature cannot be predictably manufactured but emerge organically from relational interactions between ecosystems and individuals (Fischer & Eastwood, 2016; Raymond, Giusti, et al., 2017). Rather than planning urban ecosystems to produce particular CES, the strategy advocates providing diverse opportunities for human–ecosystem interactions. In the context of declining contact with nature among urban residents (Soga & Gaston, 2016) and consequent impacts on nature conservation (Dickinson & Hobbs, 2017; Pyle, 2003), CES have been recognised as a way to increase contact with nature (Andersson, Tengö, et al., 2015). Planners therefore can provide opportunities for relational interactions with urban nature (Fischer & Eastwood, 2016; Fish, Church, & Winter, 2016) given the importance of urban green and blue spaces (UGBS) for providing urban ES such as air quality regulation, noise attenuation, and recreation opportunities (Dickinson & Hobbs, 2017; Hansen, 2018; Pauleit et al., 2011).

This study focuses on urban planning in Zagreb, Croatia, after the Second World War. The primary objective of this paper is to understand how opportunities for human–ecosystem interactions were planned in socialist and post-socialist Zagreb. Green spaces were provided abundantly in former socialist countries in Eastern Europe, which implies possibly greater opportunities for human–ecosystem interactions compared to the post-socialist period (Badiu et al., 2019; Hirt, 2013). The reintroduction of the free market and private property in the post-socialist period introduced development on green land plots (Hirt, 2015). This change in socio-political context may reveal important insights about the role of urban planning in providing ES, yet there have been relatively few studies of urban ES in Eastern Europe (Poniży et al., 2017; Valánszki et al., 2019; Zwierzchowska et al., 2018). The second objective of the study is to examine how political ideologies have influenced the provision of CES. In addition to documenting Zagreb's planning history, this research provides more general

insights into planning strategies for maximising cultural ecosystem benefits in cities. We address the following research questions:

(1) To what extent did urban planning provide opportunities for human–ecosystem interactions that might co-produce diverse CEB?

(2) How did socialist and post-socialist ideologies influence the provision of opportunities for human–ecosystem interactions?

Research approach

We start from the assumption that the planning provision of CES is more accurately assessed via Fish, Church, and Winter's (2016) framework than by CES categories from MEA (2005) that were usually used in previous studies. The contemporary understanding of CES as relational processes and entities indicates that the engagement with ecosystems is not straightforward. There are many situational factors and individual responses that influence human–ecosystem interactions and the generation of CEB (Fish, Church, & Winter, 2016; Ishihara, 2018). Hence, planners cannot predictably prescribe particular CEB for particular locations. To facilitate UGBS planning in the context of such idiosyncrasy, Tandarić et al. (2020) proposed the 5P framework that thematically categorises factors influencing the CES cascade. The framework consists of five factors: place, people, past, purpose, and practices. Table 7.1 presents the 5P factors and markers for evaluating how each factor can be considered in urban planning.

Table 7.1. Markers of the 5P framework relevant at the planning level adapted from Tandarić et al. (2020).

5P factor	Factor description	Markers
Place	How might ecosystems distribution, location, size, and design affect human–ecosystem interactions?	distribution of UGBS on a city scale
		location of UGBS within neighbourhoods
		internal diversity and design of UGBS
People	How might socio-demographic trends affect human–ecosystem interactions from a long-term perspective? Were prospective users' preferences, desires and needs considered?	socio-demographic trends in the planned area
		prospective users' preferences, desires and needs regarding UGBS distribution and design
Past	How might the historical trends or events affect current human–ecosystem interactions?	the historical appearance of the place where a UGBS construction or reconstruction is planned
		traditional use of the place where a UGBS construction or reconstruction is planned
Purpose	How might the purpose reflected in the ecosystems' location, design, equipment, and diversity affect human–ecosystem interactions?	direct-use functions
		general socio-ecological functions
		functional diversity of UGBS
Practices	How might the cultural practices of other users affect human–ecosystem interactions?	contemporary cultural practices
		anticipated cultural practices
Note: marker descriptions are available on the link.		

Materials and methods

Study area

Zagreb is the political, economic and cultural centre of Croatia. It grew dramatically during the socialist period (1945–1991) (Fig. 7.2) when state-stimulated industrialisation doubled its population—from 325,000 in 1948 to 707,000 in 1991 (DZS, 2005). Socialist urban planning was greatly influenced by Le Corbusier's functionalist approach and blocks of flats were built in parkland settings (Blau & Rupnik, 2007). The reintroduction of the market economy in 1991 thoroughly changed the planning system, and housing tended to be built more densely.

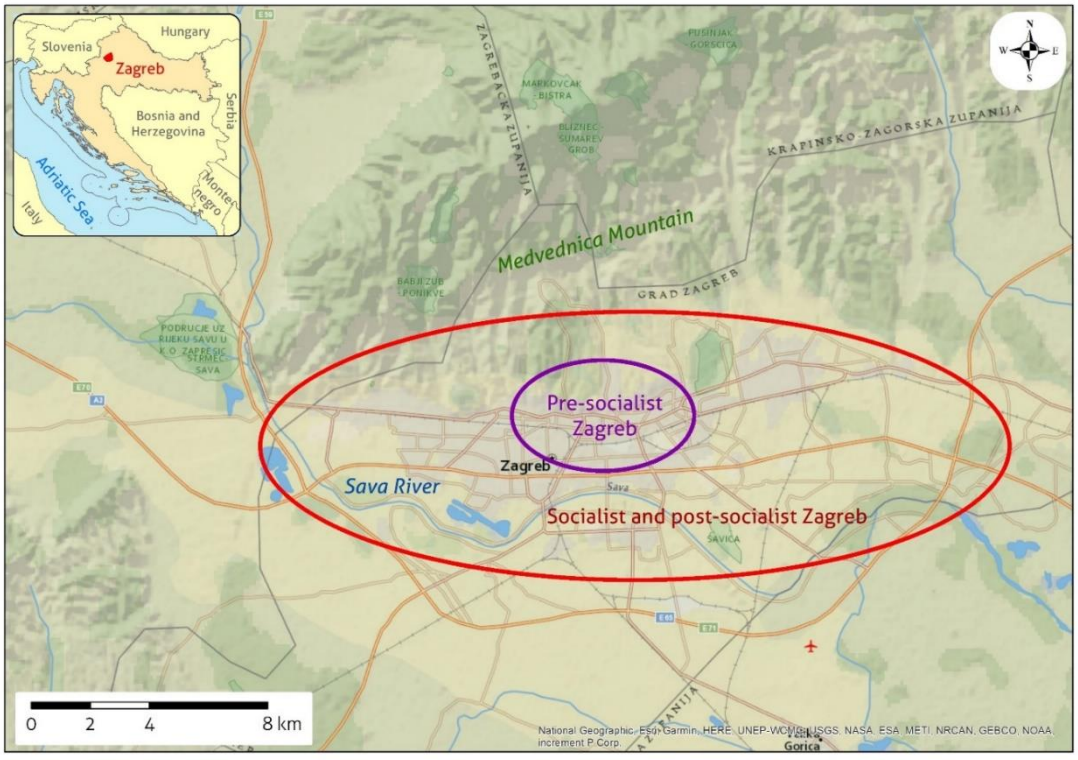

Fig. 7.2. Approximate spatial coverage of pre-socialist, socialist and post-socialist Zagreb.

Data collection

To examine the planning of opportunities for human–ecosystem interactions, we combined two sources: urban plans of Zagreb and interviews with urban planners and academics.

Urban plans of Zagreb

We obtained the plans of Zagreb from the City Office for Strategic Planning and Development. In the studied period, four urban plans of Zagreb were made (in 1953, 1971, 1986, and 2003). The first socialist urban plan (1953 Plan) was made immediately after the Second World War and anticipated expanding the city south towards the River Sava by applying Le Corbusier's conception of towers in the park. This proved too expensive to realise in the post-war conditions and the plan was not adopted. However, it greatly influenced the planning approach over the following decades. The 1971 General Urban Plan (GUP) set various quantitative standards and norms for developing new neighbourhoods and districts, and UGBS within them, by 2000. The plan sharply separated housing, business and industry in space. The weakening of the functionalist approach propelled the creation of the 1986 GUP much before 2000. While still somewhat based on the quantitative approach, the new GUP emphasised the consolidation and revitalisation of the existing city. This meant infilling the unbuilt plots and reconstructing the old structures, as well as denser housing.

The 1986 GUP was loosely followed in the 1990s because transitional planning legislation re-instated private property and replaced the city administration with private investors such as land developers. The post-socialist GUP of 2003 allowed political decisions to overpower professional planning principles (Doklestić, 2015). The plan introduced rules for highly consolidated, moderately consolidated and non-consolidated zones, thus generalising the city territory into three categories. The 2003 GUP was amended in 2007, 2009, 2013

and 2016, mostly with limited location-based changes to the land-use plan. This study analyses the three socialist plans, the 2003 GUP, and its 2016 iteration.

Interviews

We recognise that planning practice is a broader and more complex and dynamic activity than the planning provision prescribed in urban plans. Hence we interviewed planners who participated in the planning processes in both periods as well as academics who studied planning processes and their results in urban space. Semi-structured interviews with ten urban planners and eight academics from various disciplines were conducted between August 2019 and January 2020. Twenty-six planners were identified from urban plans and the planning literature and 39% of them agreed to participate. Five were active in both periods and five only in the post-socialist period. Similarly, twenty academics were identified in the academic literature based on the criteria of research scope covering urban planning and/or UGBS. In total, 40% of academics responded positively to invitation to participate, coming from the fields of sociology (3), landscape architecture (2), urbanism (1), geography (1), and anthropology (1). Interview protocols were structured and administered in a way to enable extending the discussion on any question/topic where relevant. The topics included UGBS planning documents, principles, norms, stakeholders and changes between socialist and post-socialist contexts. Interviews lasted between 42 and 171 minutes (mean 104 minutes).

Data processing

Interviews were audio-recorded and transcribed verbatim in Croatian. The analysis was carried out in Croatian in order to avoid loss of meanings and subtle indications that could not be translated into English. Transcribed interviews were organised in the NVivo 12 software package. Data were organised regarding the 5P framework factors and markers identified in section *Research approach* and cohorts, and coded accordingly. Similarly, relevant provisions from urban

plans were organised regarding the 5P framework factors and markers and coded accordingly. We employed directed content analysis (Hsieh & Shannon, 2005) to process the data. The first stage included content analyses of each urban plan according to the 5P framework markers identified in section *Research approach* (data available on the link). We assessed each marker by identifying textual features and/or map evidence as well as interpreting the overall content. In the second stage, a content analysis of interview transcripts was performed separately for the socialist and post-socialist periods, according to the same 5P framework markers as in the plan analysis. This involved documenting the planning context, applications and evaluations of the planning processes and their spatialised results.

In the third stage, each marker in each content analysis (i.e. five plans, two periods for interviews) was scored following an assessment protocol (available on the link), whereby the dominance of each marker within each 5P factor was assessed by calculating the proportion of times it was mentioned relative to other markers. Then the total 5P factor score was calculated for each content analysis by summing up the scores of individual factors divided by five. The total 5P factor score for urban plans represents the formal minimum extent to which opportunities for human–ecosystem interactions were facilitated by a plan in the period of its implementation. The total 5P factor score for interviews represents the estimated actual extent to which opportunities for human–ecosystem interactions were facilitated by urban planning in a given period (socialist/post-socialist).

Results

Content analysis of urban plans

Content analysis of urban plans revealed that socialist plans formally facilitated greater opportunities for human–ecosystem interactions than post-socialist plans (complete results are available on the link). The scores calculated for each of the 5P factors in each plan (Fig. 7.3) showed that consideration of 5P

factors, and associated opportunities for human–ecosystem interactions, varied across plans. Maximum scores were for the 1971 GUP, with the 2003 GUP containing the least consideration of 5P factors. The trend line (represented by the solid red line in Fig. 7.3) indicated that the minimum extent to which opportunities for human–ecosystem interactions were formally facilitated was generally higher in the socialist period and lower and more stable in the post-socialist period. The slight increase in the value for the 2016 GUP compared to the 2003 GUP indicates a possible shift in the trend. Both socialist and post-socialist plans contributed to the extent of interaction opportunities primarily within *place* and *purpose* factors. *Practices* factor was not considered in socialist plans, whereas post-socialist plans did not address *people*, *past*, and *practices* factors.

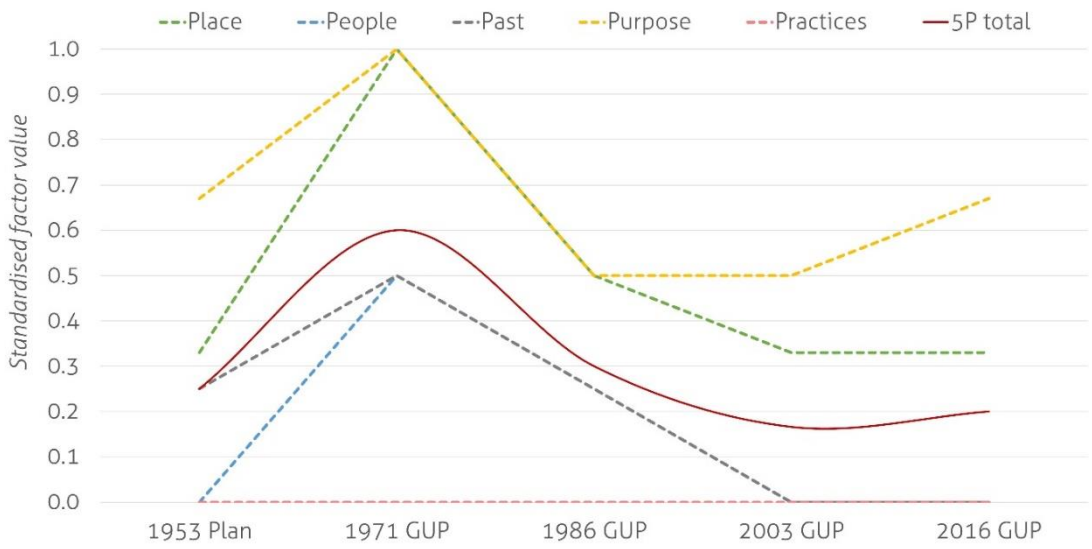

Fig. 7.3. Factor scores of the 5P framework assessment of the five urban plans of Zagreb.

The content related to human–ecosystem interactions was relatively small in all analysed plans, particularly among post-socialist plans. In general, socialist plans showed more extensive and elaborate consideration of factors influencing the distribution, design and function of UGBS than post-socialist plans, which

mainly retained and maintained the inherited landscape structure. The socialist approach of prescribing a minimum area of UGBS according to socio-demographic trends (e.g. residents' age profile) was abandoned in post-socialist plans. Neither socialist nor post-socialist plans specifically considered prospective residents' preferences, desires, or needs.

The purpose of UGBS in all socialist plans was defined through three main social goals: (i) public health, (ii) urban hygiene, and (iii) opportunities for outdoor sports, recreation and leisure. In contrast, post-socialist plans neither explicitly nor implicitly stated those or any other goals directing the provision and distribution of UGBS. Historical appearance and traditional use of locations intended for UGBS were partly considered in socialist plans (mainly in terms of autochthonous vegetated areas and cemeteries), whereas post-socialist plans did not show adequate consideration of place histories. No plans considered how UGBS were used (activities or cultural practices).

Content analysis of interview transcripts

Based on the content analysis of interview transcripts (complete results are available on the link), scores were calculated for each of the 5P factors for the socialist and post-socialist periods. Those scores (Fig. 7.4) indicated a drop in 5P factors *place*, *people*, and *purpose* after the socialist period. Interview statements verified that nine out of twelve 5P markers were explicitly considered in spatial planning in the socialist period, in contrast with only two in the post-socialist period. Factor scores based on interview transcripts showed greater fluctuation between periods (solid lines in Fig. 7.4) than averaged factor scores for socialist and post-socialist plans (dashed lines in Fig. 7.4). The divergence in the former was most significant in the *people* factor in the socialist period and the *purpose* factor in the post-socialist period.

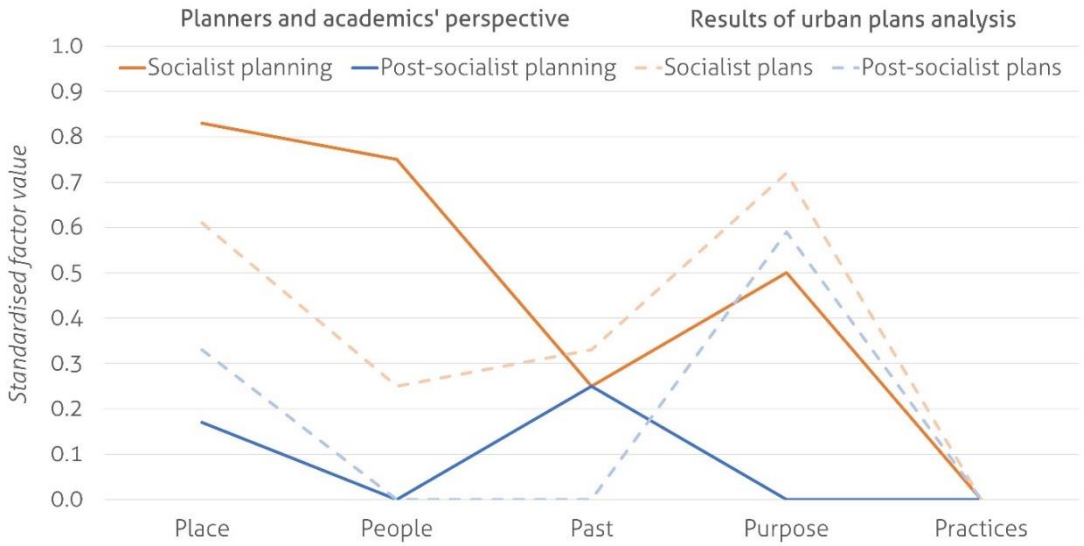

Fig. 7.4. Comparison of average factor scores of the 5P framework assessment of socialist and post-socialist urban plans and interview transcripts in Zagreb.

The much greater difference in total 5P factor scores between the socialist and post-socialist periods was established in the interview analysis (0.47–0.08=0.39) than the plans analysis (0.42–0.19=0.23). This likely arose because interviews referred to a much broader range of planning scales and aspects than the urban plans. In addition to the city-scale planning in GUPs with the limited number of regulations applicable at lower spatial scales, interviews also provided information about detailed planning (both in terms of detailed/implementation plans that were subordinate to GUPs and practical experiences from planning processes), interaction with national planning legislation and stakeholders, as well as assessment of planning processes, approaches, and outcomes in temporal perspective.

In general, both planners and academics agreed that post-socialist planning reduced the provision of UGBS and opportunities for human–ecosystem interactions. Despite generally criticising the quantitative approach in the socialist UGBS planning, interviewees agreed that the approach ensured relatively abundant and evenly distributed UGBS across Zagreb, whereas the

post-socialist provision fails to provide sufficient green space for many uses. In contrast to the results of the content analysis of plans, planners claimed that in the socialist period, citizens were surveyed about interventions in their living environments, which included UGBS. However, such surveys disappeared from post-socialist planning, which headed towards a rather monodisciplinary service (dominated by architects). In line with results from the plans, cultural practices performed in UGBS were not assessed nor considered in either period.

Discussion

Our research analysed differences in CES between socialist and post-socialist periods of urban planning in Zagreb. While opportunities for urban residents to engage with nature were considered at all time periods, the two methods employed—content analysis of plans and expert interviews—highlighted that formal and informal mechanisms for CES provision did not always align. Written plans denoted what environmental spaces (e.g. UGBS) were prescribed, yet planners' decisions often varied from these. This illuminated the complexity of UGBS planning, a multitude of scales and venues in which it operated, and nuances between formal requirements (what was prescribed) and planners' decisions (what planners were free to decide). In the following sections, we discuss findings in the contexts of research questions, practical implications of the proposed assessment framework, as well as conceptual and methodological implications.

Planning provision of diverse opportunities for human–ecosystem interactions

The assessed markers influence how prospective users would react to and interact with UGBS. The results show that urban planning considered *place* and *purpose* more than other 5P factors. Considering the associated markers, those two factors correspond to the dimensions traditionally addressed in spatial planning (Pegan, 2007). On the other hand, *people* and *past* factors were

considered rather less. These factors involve adjustments with social dynamics over time, whereas physical urban structures are relatively static and resistant to changes. While socialist normative planning accounted for anticipated socio-demographic trends, interviewees emphasised that once provided, UGBS were rarely reconsidered and modified. Finally, *practices* factor, which includes patterns in UGBS use and could provide essential insights for UGBS planning and design, were never considered.

Differences between individual 5P factors and disparities between priorities espoused in planning documents and those mentioned by practitioners indicate the complex role of urban planning in facilitating CES. Indeed, the interview analysis showed that urban planning is much more dynamic and multifaceted than the plans suggest. There was considerable planning activity happening between the plan adoption dates that affected the provision of opportunities for human–ecosystem interactions. Some activities were prescribed in lower-scale plans, while others were part of unspoken principles and rules followed in plan drafting and implementation stages. The most striking example pointed out by interviewees is socialist planners' commitment to the Corbusian greenspace matrix, which was regularly implemented in neighbourhood planning, and even GUPs included provisions to facilitate it, but no plans ever specifically mention it (cf. Cvetnić & Klemenčić, 2008). Hence, understanding how urban planning influenced the provision of CES in a certain period would require analysis of both urban plans and planning practice performed in that period.

The results indicate a decrease over time in (i) the total 5P factor scores as a marker of CES overall, (ii) individual scores of specific factors, (iii) the number of markers within the 5P factors considered, and (iv) number of markers with the estimated maximum score for both urban plans and interview transcripts between the socialist and post-socialist periods. This suggests that socialist planning facilitated opportunities for human–ecosystem interactions to a wider extent than post-socialist planning. To our knowledge, this study is the first study that has explicitly looked at how the planning provision of CES has evolved over

a period of socio-political transition. Although the case of Zagreb is not directly comparable to most other cities globally, it is a stark example of an insight that is of broad application: that the influence of socio-political context on urban planning paradigms and practice can have longstanding legacy effects on the provision of urban CES. Below, we discuss results from this study in relation to international literature on UGBS provision and diminishing contact with nature.

UGBS provision is considered an essential prerequisite for enabling interactions with nature (Lin et al., 2014; Soga et al., 2015). Our analysis showed that post-socialist UGBS planning in Zagreb mainly concerned those locations that were already included in the socialist plans. This ties in with the decrease in the provision of UGBS widely reported for other post-socialist countries (Badiu et al., 2019; Hirt, 2012; Kabisch & Haase, 2013; Kristiánová, 2016). It is assumed that the extent of provided opportunities is a function of the number of UGBS users (normalised by total UGBS area) and the diversity of cultural practices performed in UGBS. Our findings would, thus, propose the following hypotheses for further research: (1) the average number of users in socialist UGBS would be greater than the average number of users in post-socialist UGBS in Zagreb, and (2) the average diversity of cultural practices performed in socialist UGBS would be greater than average diversity of cultural practices performed in post-socialist UGBS in Zagreb.

Most research in the field of diminishing contact with nature relates to Western cities with few insights from the socialist and post-socialist countries (for exceptions see Djokić et al., 2016; Whitehead, 2005). While we did not explore diminishing contact with nature *per se*, the opportunities for human–ecosystem interactions undoubtedly influenced that process. In that sense, our findings suggest that the influence of urban planning on contact with nature in Zagreb was more positive in the socialist than post-socialist period. However, contact with nature did not necessarily decrease after 1990. Given that most of Zagreb's spatial expansion occurred in the socialist period, the predominant proportion of Zagreb's urban space was planned with greater consideration of factors contributing to opportunities for human–ecosystem interactions

compared to sections planned after 1990. Since post-socialist plans mainly preserved the inherited situation regarding UGBS, the opportunities provided in the socialist period often survived. Many socialist-provided UGBS were maintained after 1990 and present-day citizens of Zagreb still have many opportunities for human–ecosystem interactions.

How political ideologies shape opportunities for human–ecosystem interactions

Despite the changing dynamics shown in Fig. 7.3, all socialist urban plans of Zagreb set a wider formal minimum extent to which opportunities for human–ecosystem interactions were provided than post-socialist plans. Interviews indicated that the divergence in the estimated actual extent between the two periods was probably even more extensive. The main differences were identified in terms of (i) typology and function of UGBS, (ii) socio-demographic trends, and (iii) UGBS distribution and design.

Typology and function of UGBS

Although functions of UGBS were considered in both periods, socialist planning was found to have had a more diversified UGBS typology and focused more on multiple direct-use and general socio-ecological functions of UGBS than post-socialist planning. Since workers were the dominant social class in Yugoslavia, the official policy was to create a favourable living and working environment to stimulate productivity (Vukić, 2007). Urban nature was considered crucial in achieving the three consistently pursued social goals of urban planning: public health, urban hygiene, and recreation and leisure for working people. All the neighbourhoods were planned with a relatively balanced built and green spaces ratio.

This functionalist perspective on urban nature was present already in the 1953 Plan, which proposed new neighbourhoods be built as Corbusian ‘towers in the park’ where abundant UGBS were expected to improve living conditions in

the city (aeration, air purification, insolation) and provide opportunities for recreation and leisure for working people. This would facilitate relaxation and rest from work and good physical condition, which would reduce both sick leave and healthcare costs (Antolić, 1953; Stanić, 2016). Even though the plan was rejected because of the poor financial situation in Zagreb, the Corbusian concept was consistently implemented after the late 1950s (Fig. 7.5) (Cvetnić & Klemenčić, 2008). Moreover, parks, children's playgrounds, and sports and recreational grounds were systematically nested into the Corbusian greenspace matrix to facilitate the accessibility of direct-use UGBS within walking distance from homes.

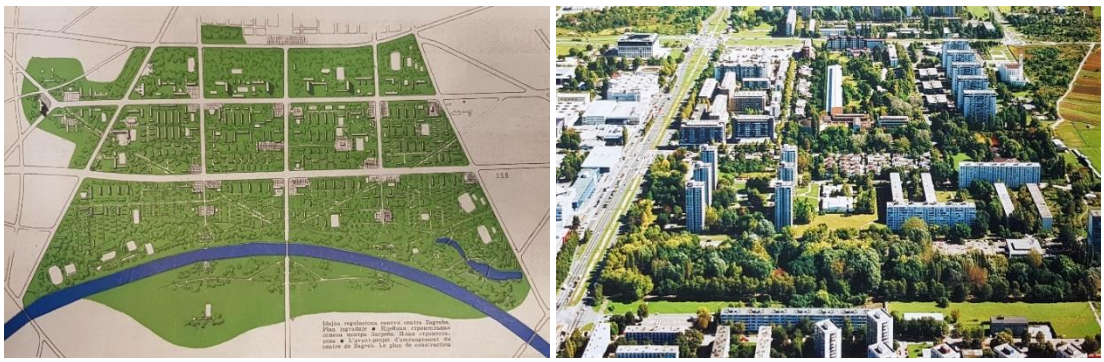

Fig. 7.5 Left: 1953 Urban Regulation Plan of Zagreb: proposal for the area south of the railway (Antolić, 1949). Right: The Corbusian-style neighbourhood of Siget (Hrg, 1999).

The functionalist approach to urban nature was innate to Marxist socialist ideology (Pepper, 1993; Tulloch, 2015). And indeed, the space for building such vast neighbourhoods with abundant UGBS was obtained by the nationalisation of peri-urban land in Croatia (Tandarić et al., 2019) as in other socialist states (Whitehead, 2005). The 1980s saw the weakening of the functionalist approach and loosening of social planning goals, resulting in denser construction and more compressed green spaces between buildings. The content analysis detected this change in the reduced formal minimum extent to which opportunities for human–ecosystem interactions were planned in the 1986 GUP. The

reintroduction of private property and abolition of the land expropriation instrument after 1990 completely changed the urban planning context.

The planning system was adjusted to the market economy, which involved the transfer of much of the land development role from the city administration to private investors, simplification of planning provisions to stimulate private investments, and blurring the line between public and private interests (Knežević, 2003; Svirčić Gotovac, 2010). Such changes were observed across central European post-socialist cities (Kristiánová, 2016; Vujošević, 2004). Along with reducing the role of authorities in planning, the social goals disappeared from urban plans. Even though certain provisions regarding UGBS in new residential sections remained in post-socialist plans, interviewers pointed out that they were often worded to allow different interpretations and that many private investors took advantage of that.

Furthermore, the UGBS typology was simplified—deprived of function and defined by the degree of construction allowed in UGBS. This permitted the indulgence of influential individuals and organisations' wishes. On the one hand, it allowed substituting natural and recreational elements with commercial ones like shops and cafés (cf. Haase et al., 2018; Zupan & Büdenbender, 2018). On the other hand, the authorities were given political leverage to unilaterally allow construction in UGBS. Several interviewees recalled a recent case where the authorities authorised building a large church in Savica Park. When citizens' resistance and protests prevented the construction, the authorities decided to refigure the park into a highly artificial public space, which was once again prevented by people stopping machinery from entering the park. The residents' opposition to such reconstruction implies that they were aware of the potential loss of opportunities for human–ecosystem interactions and connections they formed with the place.

Socio-geographic trends

Socialist planning defined spatial provision of different types of UGBS following projected socio-geographic trends. Planning solutions were usually based on expertise and rarely sought and accounted for laypeople's input (Hirt, 2005). Consequently, provisions in socialist plans were usually informed by various sectoral baseline studies created by multidisciplinary planning teams. Similarly, socio-demographic projections informed the normative for size, function, and content of UGBS at different spatial scales. This facilitated the availability and accessibility of diverse UGBS across socialist urban space in Zagreb. While urban plans provided no evidence of surveying citizens' preferences, desires, and needs, interviewees pointed out that immediate problems in citizens' living environment were surveyed at a local scale. This was facilitated by the decentralised planning system (on the district level).

The situation worsened after 1990 with the centralisation of administration and planning systems. The technocratic approach could guide urban development in the dynamic conditions of diverse public and private initiatives and investments (Hirt, 2005). Private investors' requests for business freedom led to loosening planning provisions. The end of the need for baseline studies resulted in the loss of many disciplines from the planning system, especially social sciences and humanities (Cavrić & Nedović–Budić, 2007). The provisions regarding minimum greenspace area were transferred from general to detailed plans, which interviewees claimed were initiated or sometimes even drafted by investors themselves. The devaluation of expert opinion and growing power of private investors was repeatedly given as the reason for the critical lack and low quality of UGBS in post-socialist residential areas.

UGBS distribution and internal diversity

Socialist planning considered the provision of an even distribution of diverse UGBS across Zagreb at different spatial scales more than post-socialist planning. The technocratic approach aimed to harmonise the UGBS distribution

with demand for them and provide the design that would stimulate physical activity and thus contribute to the public health goals. Even though not explicitly named in the plans, the omnipresence of a Corbusian greenspace matrix was ensured through the rule that UGBS "should occupy at least 60% of a neighbourhood area" (GUP, 1971, p. 18). This effectively meant that there were opportunities for human–ecosystem interactions throughout most housing and commercial areas. This modernist approach, with tower blocks in a parkland setting, was often criticised because of the cramped and poor quality living conditions in the West, and occasionally in socialist cities too (e.g. Dakić & Kritovac, 1973). However, the quality of the green spaces has improved over the years as the trees have become more established, as highlighted in interviews and literature (e.g. Klarić Jelenski, 2020).

The high proportion of unbuilt space is almost unimaginable in post-socialist settings because of land privatisation. One interviewed planner (40/M) described post-socialist neighbourhoods saying that "*all unbuilt areas are de facto either mandatory passages for fire trucks or roofs of garages which had to be greened. The rest of the greenery is in plant pots.*" The development of new parks was enabled via 'city projects', which were supposed to regulate the development of new urban areas in public–private partnerships. This instrument, however, was loosely regulated, especially in the 2003 GUP. On the other hand, pressure on undeveloped land plots reserved for UGBS increased along with interests in building profitable new housing and shopping centres (Gulin Zrnić & Vranić, 2015). Such pressure aligns urban development in Zagreb with other post-socialist cities (Djokić et al., 2018; Haase et al., 2018; Zupan & Büdenbender, 2018).

Practical implications

The need for a novel approach to assessing CES in urban plans

In this study, we followed the CES cascade model conceptualised by Fish, Church, and Winter. (2016) which understands CES as relational processes and entities which people value for their contribution to their wellbeing. The relationality of CES implies that each person responds to and interacts with an ecosystem following their own preferences, desires, needs, and values they hold (cf. Raymond, Giusti, et al., 2017). If CES are subjective and person-based (Chan et al., 2016; Fish, Church, & Winter, 2016), then planning for CES means facilitating opportunities for human–ecosystem interactions through which people would be able to co-produce CES and generate CEB rather than planning for particular CES.

Previous assessments of CES in urban plans used the ES categorisation from MEA: Wilkinson et al. (2013) assessed nine different CES, Cortinovis and Geneletti with their associates (2018; 2020) assessed recreation as the only representative of CES, whereas Rall et al. (2015) assessed CES as a single subcategory of ES. These studies all assessed CES using a similar natural-science paradigm as other MEA categories of ES, without accounting for CES' relational character (Chan et al., 2011; Raymond, Frantzeskaki, et al., 2017). In addition, CES assessed by Wilkinson et al. (2013) correspond to different elements of the ES cascade: services (*Recreation and ecotourism*), benefits (*Sense of place*, *Aesthetic*, *Inspirational*, *Educational and knowledge*, *Health*) and values (*Cultural heritage values*, *Spiritual and religious values*) (cf. Blicharska et al., 2017). Dissolving the distinction between those elements, which can be planned to different extents, makes it unclear analytically from where the benefits then arise (Fish, Church, & Winter, 2016). Haines-Young and Potschin (2018) developed the Common International Classification of Ecosystem Services (CICES), which accounted for the ES cascade in all categories. However, Maund et al.'s (2020) study showed that not all CES can be sufficiently captured by CICES.

We argue that a limited number of moulded categories of CES cannot reflect their relational and subjective nature and can therefore yield very limited operational insights into how planning can stimulate the generation of contributions to human wellbeing. In that sense, Tandarić et al.'s (2020) "hatch and grow" strategy replaces the making of objective categories with co-produced diverse CES that correspond with individuals' preferences, desires, needs, and values. Such an approach positions CES better within the planning context by outlining two venues in which planning can facilitate opportunities for human–ecosystem interactions: by providing spaces for interaction and support for cultural practices. This is operationalised through the 5P framework, which gathers the factors relevant for planning those opportunities (Tandarić et al., 2020).

Insights for assessing CES in the urban planning context

Assessing how CES are considered in urban planning may be required when evaluating the planning approach to facilitating human–ecosystem interactions and reducing the diminishing contact with nature. The results can illuminate aspects that can be improved and inform overall UGBS planning. Here we outline and discuss practical recommendations arising from the results of this study.

Combining different types of knowledge can improve assessment of CES opportunities. Because of its orientation on plannable aspects, the 5P framework was useful for content analyses of urban plans and interview transcripts. It allowed limitations in different data sets to be recognised. Combining the results of different datasets analyses allowed better contextualising of findings from individual dataset analyses and enabled a more precise estimation of the extent to which urban planning facilitated human–ecosystem opportunities. Besides general urban plans and interviews with urban planners and academics, the possible relevant datasets include the planning legislation, lower-scale plans, and literature documenting, analysing, reviewing, and critiquing the planning documents, projects, practice and approaches.

Assessment should account for what analysed data can and cannot tell. The scoring approach to the content analysis of the plans is intended to provide indicative rather than determinative results. For instance, the combined interpretation of findings from plans and interview analyses illustrated that plans did not reflect accurately the planning practice of the period in which they had originated but instead approximated the general planning stance towards the provision of interaction opportunities. Data had to be interpreted with caution. For example, the plans sometimes omitted addressing certain aspects, such as rules for observing existing vegetation or landforms when planning new UGBS, which were typically dealt with in practice.

Different datasets feature different reliability. It is essential that assessment accounts for data reliability. Our findings illustrated that the data from urban plans is bounded by spatial scale and formal planning principles that may only be loosely followed in practice. On the other hand, interviews with planners and academics may provide rich insight into the planning practice, plan implementation, and the interplay between formal procedures and broader social, political and economic circumstances. In addition, interviews depend on subjective impressions of people, which may become distorted over time. When it comes to historical considerations, this study showed that people are more likely to remember positive than negative experiences and impressions from the past (Leist et al., 2010).

Assessment scores should be read and interpreted carefully. The interview statements corroborated the assumption that, rather than reflecting the actual extent of opportunities provided in space, urban plans set the formal minimum extent of the interaction opportunities for the period they were implemented. For instance, while urban plans did not prescribe consideration of the historical appearance of places for which UGBS construction is planned, some individual planners voluntarily observed it and thus possibly facilitated better opportunities for human–ecosystem interactions. On the other, total 5P factor scores based on the interview statements appeared to reflect the actual extent of the interaction opportunities for a given period; however, due to the lower

reliability of historical interview data, we interpreted them in the context with findings from analysed plans. It is also important to acknowledge that the reported extent of the interaction opportunities may be larger for some 5P factors and smaller for other factors than the formal minimum extent (see Fig. 7.4) because of the differences in the scale and information contents between different datasets.

The assessment result should inform planning. The 5P framework is designed to evaluate how different relevant markers contribute to the facilitation of interaction opportunities. However, assessing each value also outlines shortages that planning failed to account for, resulting in a lower-than-maximum score. Moreover, even the maximum-scored markers may point to possible advances that could improve opportunities for human–ecosystem interactions. In cross-temporal assessments, such as this one, comparisons of how each marker was considered in different periods (or plans) may also reveal abandoned positive contributions that might be re-evaluated and possibly re-implemented.

Insights for planning in post-socialist cities

Although this study was restricted to Zagreb, the approaches and paradigms implemented provide useful insights for planning for CES in post-socialist and non-socialist contexts. First, planning abundant UGBS in socialist Zagreb critically improved the opportunities for human–ecosystem interactions, and the extensive Corbusian greenspace matrix is now considered one of the key qualities of socialist neighbourhoods (Klarić Jelenski, 2020; Svirčić Gotovac, 2009). In contrast, greenspaces in post-socialist sections are criticised for small size and, in some cases, even being reduced to plants in pots, which reduces CES. Greening new neighbourhoods could provide varying opportunities for intentional and incidental encounters with urban nature (Beery et al., 2017) and have a measurably positive effect on communities' behaviour and sense of place (Kelbaugh, 2000). The recent construction of new neighbourhoods in Zagreb and other cities reflects the demand for 'living in the park' (e.g. Green Side Residence

or 4 Tornja). However, it should be noted that such developments in non-socialist settings may lead to *green gentrification* (Campbell–Arvai & Lindquist, 2021) and require careful planning.

Second, interactions with nature require environments that people will want to interact with and could relate to. While both planning systems in Zagreb neglected citizens' preferences, desires, needs, and values, socialist planning defined the needs for UGBS based on projections of socio-demographic trends. This resulted in well-distributed and accessible UGBS across the residential quarters. In addition, spatial opportunities for physical activity were provided to support public health. In a world where obesity and related health issues are increasing, the provision of accessible and attractive UGBS contributes to better public health (WHO, 2016). Surveying citizens' preferences, desires, and needs and their involvement in planning could greatly improve and advance the opportunities for human–ecosystem interactions and attract more users to UGBS. The study of the participatory potential of inhabitants by Careva et al. (2018) indicated twenty UGBS in Zagreb for which participants proposed and agreed upon improvements that would increase their use. Finally, engaging citizens in UGBS stewardship would promote even firmer relational connections with local ecosystems (Andersson, Tengö, et al., 2015).

Third, unlike post-socialist plans, which lacked detailed objectives for UGBS provision, socialist planning aimed to improve and maintain public health and urban hygiene while providing (semi)natural spaces for recreation and leisure. Such a multifunctional role is in line with recent calls for planning and designing UGBS to provide multiple and varied ES (Pauleit et al., 2011) while at the same time providing opportunities for interactions with nature and the generation of CEB. Multifunctional green infrastructure consisting of varied UGBS and Corbusian-style green spaces has a great potential for increasing connectivity between larger UGBS. This would at the same time improve the quality of the environment, ecological conditions for urban wildlife (Di Marino et al., 2019) and provide better opportunities for intentional and incidental encounters with urban nature.

Conclusion

The increasingly recognised relational nature of CES has been rarely accounted for in assessments of ES in urban plans. This suggests that urban planning cannot effectively facilitate the provision of particular CES, but it can and should facilitate the opportunities for meaningful human–ecosystem interactions from which CES will arise and generate contributions to human wellbeing. In this paper, we assessed the extent to which opportunities for human–ecosystem interactions in Zagreb were facilitated through socialist and post-socialist urban planning. The findings indicated that interaction opportunities were facilitated to a wider extent in the socialist than post-socialist period. Socialist planners systematically planned UGBS across urban space, ensuring their availability, accessibility and suitability for prospective users while at the same time contributing to various social goals. In attempts to distance planning from the socialist ideology and facilitate private investment, the post-socialist lawmakers largely deregulated the planning system, which resulted in a considerable reduction in the provision of additional UGBS, and, consequently, the new interaction opportunities.

The proposed approach to assess CES in urban plans successfully identified markers relevant in urban planning that influenced the extent to which planning facilitated the opportunities for human–ecosystem interactions. This approach accounts better for the planning provision of CES than approaches applied in earlier studies. Moreover, by considering dimensions of CES that can be directly addressed by urban planning, it can serve as a valuable tool for improving the extent to which interactions opportunities are facilitated by planning in practice.

The end of PAPER VII.

8. Discussion and conclusions

"Man lives from nature (…) and he must maintain a continuing dialogue with it if he is not to die. To say that man's physical and mental life is linked to nature simply means that nature is linked to itself, for man is a part of nature."

Karl Marx (1975, p. 276)
philosopher and socialist revolutionary

This chapter discusses the findings from the empirical chapters and synthesises them to outline answers to the set research question. The chapter is organised to provide a logical flow from findings to their interpretation in the context of research objectives. The first section summarises findings, which are then used in the second section to answer the research question. The third section discusses the performance of the heuristic for exploring CES in planning context in empirical chapters. The fourth section outlines lessons from different ideological approaches to UGBS planning for the operationalisation of CES in practice. The lessons arise from critical discussions in the two previous sections. The final section provides suggestions for future studies that arose from the interpretation of findings in the context of the research question.

8.1. Summary of findings

> *"Technocratic planning—for many years the poster child of communism—was well fitted to guide urban growth during state socialism […] It is, however, clearly less fit to guide urban growth in the dynamic conditions of post-communism."*
>
> **Sonia Hirt** (2005, pp. 220–221),
> urban and environmental planning scientist

This thesis explored the interplay between the provision of urban CES and political-ideological contexts in which they were provided. While CES are inherently produced through human–nature interaction, nature in modern cities is formally governed through spatial consideration and planning, expressed in the form of various UGBS. Since research on CES in planning is relatively young, a fitting heuristic had to be developed to support this study. The "hatch and grow" strategy is founded around the increasingly recognised relational character of CES, which is reflected in their qualities of being place-based, person-based, and susceptible to timing (Chan et al., 2016; Fish, Church, & Winter, 2016; Raymond, Giusti, et al., 2017). In other words, UGBS users perform cultural practices that reflect their preferences, desires and needs regarding the place character, their current emotional state, and external situational conditions (e.g. weather, crowdedness). Planners can clearly manipulate only the place character and sensitise it to personal and situational factors. The strategy, therefore, recognises that urban planning cannot directly supply CES, but instead, it can create spatial opportunities for the CEB generation. This is an important premise for interpreting the findings in the context of research questions. The critical evaluation of the "hatch and grow" strategy in research and planning contexts is given in section 8.3.

As expected, this study confirmed that the CES concept was never explicitly used in Zagreb's urban planning. However, a limited number of specific CEB (rest, relaxation, long-term health benefits) were accounted for in urban plans. Employment of the "hatch and grow" strategy heuristic in empirical chapters revealed the positions of socialist and post-socialist urban planning in Zagreb regarding the provision of CES via its 5P framework. The urban plans analysis showed that socialist plans aimed to provide minimum hygienic and health conditions and rest and recreation opportunities for the working population through available and all-present UGBS. Subsequently, the proportion of UGBS within socialist sections of the city increased after 1944. The number and area of city-, district- and neighbourhood-level parks in new sections were defined per prospective population demographics, although rapid expansion and financial circumstances impeded the plan implementation to some extent, leaving some planned UGBS neglected. In addition, virtually all non-building and non-traffic surfaces in neighbourhoods were greened (here named *Corbusian greenspace matrix*) to contribute to the above-mentioned aims.

Insistence on the technocratic approach minimised the public's influence on planning propositions leading to special design plans for prominent UGBS and generic design for other UGBS, including the Corbusian matrix. Nationalisation of land for new urban sections would have enabled planning 'by the book' if demand for housing was not a pressing issue throughout most of the socialist period. Consequently, the UGBS proportions embedded in socialist planning norms were never fully achieved at the neighbourhood level. Nonetheless, the generous distance between buildings allowed broad zones of Corbusian greenspace (Fig. 8.1), interrupted only by ever-expanding traffic surfaces. However, financial circumstances often impeded landscaping of the Corbusian matrix and even neighbourhood-level parks, providing only light design and equipment requiring minimal maintenance. Such domination of quantitative over qualitative aspects of UGBS planning often encouraged residents to intervene in the Corbusian matrix by planting trees and shrubs, installing play courts and benches along trample trails, etc. and forming wild collective gardens on neglected land.

Fig. 8.1. A Corbusian green space matrix in-between two buildings in Trnsko Neighbourhood (photo taken on 23/06/2021 by N. Tandarić).

Apart from protecting historical greenspaces, the post-socialist plans did not aim for the level of appreciation of urban nature's contributions to human wellbeing demonstrated in the socialist period. The UGBS provision was treated as an urban planning task without stating the public health and urban hygiene aims indicated in the socialist plans. Subsequently, the proportion of UGBS in the total area of post-socialist sections was much lower compared to socialist neighbourhoods. Responsibility for land development was transferred from city administration to private investors, which led to a radical reduction in minimum distance between buildings and creation of only small and mutually disconnected green patches (Fig. 8.2), whose primary function was aesthetical rather than use or ecological. Despite the democratisation of public policy, citizen participation in UGBS planning remained negligible, which was best illustrated by multiple resident protests against unilateral decisions on redevelopment and redesign of Savica Park and Fascism Victims Square (see Chapter 7). In addition, the post-socialist city administration never planned new city- or district-level UGBS. The establishment of the City Gardens project appears as the only continuous and systematic endeavour in providing new UGBS, although interviewed gardeners signalled their restrictive use.

Fig. 8.2. A green patch in Vrbani Neighbourhood (photo taken on 17/03/2021 by N. Tandarić). Note the 'sterile' design, with hard borders and limited mid-storey vegetation.

The following sections draw on the findings presented above and synthesise them to answer the fundamental research question set in the Introduction:

How did urban planning in Zagreb incorporate, enable and respond to CES across differing socio-political and ideological periods?

8.2. Opportunities for the generation of CES in Zagreb facilitated by socialist and post-socialist urban planning

"Novi Zagreb was conceptually designed as an example of living in the park."

Interviewed urban planner (65/M)

The findings above indicate that socialist planning provided more venues for interaction with nature than post-socialist planning. However, studies have determined that the high availability of UGBS may not necessarily lead to more meaningful human–nature connections (Lin et al., 2014), which are vital for the generation of many CEB. Indeed, CEB arise from relational interactions between humans and ecosystems, which rests on the premise that people value not only ecosystems but also their relationship and interaction with those ecosystems (Chan et al., 2016; Ono et al., 2021). While relational values are ever-changing through individual interactions, they influence how a person appreciates experiences, capabilities, and changes to their identity generated through those interactions and their future engagements with nature (Mattijssen et al., 2020). Hence, if a person who does not feel connected to nature often walks next to or through a park but never has a memorable experience, they will likely not change their level of interaction with nature, and subsequently, they will not be able to co-produce and receive many CEB that originate through more intense human–ecosystem interaction.

However, if a UGBS is designed to create multiple ambiences (with varied visibility and soundscapes), contain diverse natural and non-natural elements, and sustain rich biodiversity, it will more likely attract visitors with varied preferences for nature, stimulate diverse cultural practices and subsequently

support co-production of diverse CEB (Beery et al., 2017; Giles–Corti et al., 2005; McEwan et al., 2020). Moreover, Beery et al. (2017) posit that incidental memorable experiences will likely stimulate intentional nature encounters. Conversely, UGBS with monotonous, unvaried or repetitive elements can hardly support diverse cultural practices, suggesting that they can satisfy only a narrow range of prospective users' preferences, desires, and needs (Jaligot et al., 2019). This will, of course, be conditioned by the availability of other UGBS and their characters. For instance, sparsely vegetated Savica Park may sustain strolling, running, or socialising, but its high visibility and minimal noise inhibition likely discourage practices that require solitude and cover (e.g. meditating, dating), which are supported in more densely vegetated Newlyweds Park that was not designed generically (Klaić, 1974).

Translated to the case of Zagreb—the generic socialist design of most UGBS with usually unvaried elements, especially the non-natural ones, could support only a limited range of cultural practices. Furthermore, residents' grassroots interventions to the Corbusian matrix (e.g. wild gardens) and the presence of neglected land imply the failure of provided UGBS (however numerous) to satisfy the preferences, desires and needs of all prospective users. Indeed, interviewed gardeners reported much stronger connections to their gardens than to other UGBS in their neighbourhoods, and some even stopped frequenting other UGBS. Rare, small and disconnected green patches in the post-socialist period, which could not sustain numerous elements nor multiple ambiences, could support an even narrower range of cultural practices leading to fewer co-produced CEB. Even the spatial character of city gardens, founded on a decades-long tradition of wild collective gardens, was restrictive regarding the supported cultural practices. Moreover, the overutilisation and (attempted) reconstructions of socialist UGBS indicate the lack of official consideration for already established relational connections between UGBS and their users. Considering both quantitative and qualitative aspects of UGBS planning and implementation in Zagreb, findings suggest that **socialist planning likely created more opportunities for the generation of CEB than post-socialist planning**.

The abundant provision of UGBS after the Second World War facilitated to some measure the preservation of human–nature connection among incomers who mostly moved from the countryside (Magdalenić, 1971). Despite the generic design, extensive Corbusian matrix and parks enabled daily contact with nature, which was especially valuable for children. In contrast, the sterile ambience of green patches in post-socialist sections could hardly encourage their direct use (compare Fig. 8.1 and Fig. 8.2 above). The nature of the CES cascade (Fish, Church, & Winter, 2016) imposes that if an environmental space does not attract people to use it (i.e. perform cultural practices), the process of CEB generation gets inhibited, diminishing the creation of meaningful connections with this space. Relational values about nature have been recognised as drivers of pro-environmental stances and actions (Mattijssen et al., 2020; Winkler & Hauck, 2019).

If children grow up disconnected from nature (and young families with children are usual residents of post-socialist sections), they will likely be unable or unwilling to connect their children with nature (Louv, 2008; Riechers et al., 2021). Hence, in cities where the provision of CES and reconnection with nature come to be planning goals, planning policy cannot treat UGBS (especially those at the neighbourhood level) as mere remnant spaces, the sum of which must reach the prescribed minimum. At the very least, provided UGBS must be large enough to host an ambience and character that would invite users and facilitate cultural practices. Even though the provision of UGBS in Zagreb greatly decreased in the post-socialist period, the overall opportunities for interactions with nature and subsequently the CEB generation likely remained around the level reached by the end of the socialist period. This was a consequence of contemporary Zagreb predominantly resulting from massive but mainly planned expansion between 1945 and 1991, which ensured plenty of UGBS.

8.3. Revisiting the "hatch and grow" strategy

> *"A strong argument can therefore be made that an investment in nature and benign interactions with nature (as in CES) would be in our collective interest."*
>
> **Kai M. A. Chan** and **Terre Satterfield** (2016, p. 352), proponents of the ecosystem services concept

The "hatch and grow" strategy was devised having in mind two practical requirements: a heuristic for exploring planning consideration of CES and guidance for integrating CES in urban planning. Its application in the case study of Zagreb facilitated rich findings of how opportunities for nature experience were provided and insights into how that might have influenced the CEB generation. This section evaluates the performance of the strategy in a research context and its suitability for practice and proposes improvements resulting from the application.

8.3.1. Performance of the "hatch and grow" strategy in research context

The "hatch and grow" strategy was applied when exploring how human–ecosystem interactions occurred in different planned ecosystems in Zagreb (Chapter 5) and how historical planning provisions affected the generation of CEB (Chapter 7). In both cases, the strategy helped explain the trajectory between planning and provided opportunities for human–ecosystem interactions that could lead to the generation of CEB. Both main components of the strategy (Fish, Church, and Winter's CES framework and 5P framework) proved helpful, complementing each other. The CES assessment framework facilitated the

identification of reported and observed environmental spaces, cultural practices, benefits and goods from the interview and observation data; but as expected, it could not by itself explain how urban planning provisions and decisions affected the supply of the opportunities for human–ecosystem interaction. Thus the outputs of the CES framework were processed through the 5P framework together with other collected data. This resulted in plausible explanations of the emergence of human–ecosystem interaction opportunities.

The interview method of acquiring data yielded invaluable context to the CES co-production in the case study UGBS, hinting in some cases and revealing in other cases the relational processes and links between different elements of the CES cascade. Most deductions in this section arise from interview-generated contextual data, highlighting the value of qualitative insights when applying the strategy in the planning context. Nevertheless, a discrepancy between reported and observed cultural practices made it clear that sole interviews cannot detect all the elements of the CES cascade. A methodological plurality is needed to make the assessment more comprehensive (Fish, Church, Willis, et al., 2016).

8.3.2. How did the empirical application of the "hatch and grow" strategy advance knowledge about CES?

Applying the "hatch and grow" strategy in a series of empirical studies has generated insights into the CES concept. Since the strategy incorporates Fish, Church, and Winter's (2016) CES framework, the insights are related to their conceptualisation of CES, which was designed as a heuristic for ecological knowledge production.

Determinants of human–ecosystem interactions

The contexts of the CES co-production processes, gathered via interviews with parties involved in the processes, illuminated their motivations for interacting with nature that affected the selection of particular ecosystems and

cultural practices, and in some cases, traced the trajectory from interaction to generated CEB. Established motivations corroborated the premise outlined in section 2.2 that human–ecosystem interactions are influenced by both users' cultural values and emotional state at the moment (Nelissen et al., 2007). These were conceptually combined into personal preferences, desires, and needs. In the elaboration of the CES framework, Fish, Church, and Winter (2016, p. 212) proposed that, in the human domain, CEB co-production is influenced by cultural values, which include "collective principles and life goals, and the associated norms and expectations that influence how ecosystems accrue meaning and significance for people". While cultural values indeed define spans of people's actions and decisions, the individual decisions and actions in specific situations/moments are further influenced by more transient emotional state (e.g. need/urge to escape, hang out, seek solitude, rest—fulfilled at a particular moment). Findings suggest that personal preferences, desires and needs might be additional important factors that explain situational decisions regarding the selection of particular environmental spaces and cultural practices.

Environmental space

Environmental spaces represent the spatial contexts of human–ecosystem interaction. In translating Fish, Church, and Winter's (2016) CES framework into urban context in section 2.2, urban environmental spaces were tied with UGS and UBS. Yet, findings in Chapter 5 imply that environmental spaces may not be as objectively defined as UGBS but rather delineated subjectively (often with diffuse boundaries) based on relational interactions between users and ecosystems. For instance, within the same UGBS, an environmental space for a cyclist may not coincide with an environmental space for a user seeking solitude in a clearing veiled by shrubbery. The former is likely larger than the latter and may or may not entail the latter. This is in line with Fish, Church, and Winter's (2016) notion that cultural practices shape environmental spaces, not only within their boundaries but also by defining the very extent of environmental spaces. Moreover, environmental spaces may not necessarily coincide even for different

users performing the same cultural practice in the same UGBS due to subjectivity imposed by personal preferences, desires and needs.

For instance, one cyclist in SRC Jarun may enjoy the official cycling tracks north of the lake, whereas another cyclist may choose to cycle in wilder surrounding with only dirt paths south of the lake. These examples imply that (1) environmental space corresponds to SPU as "the smallest distinct physical unit that generates a particular ES" (Andersson, McPhearson, et al., 2015, p. 158), (2) its interplay with a cultural practice is indispensable for CES to arise, and (3) in any moment a single UGBS may consist of one or more environmental spaces. This spatial inconstancy caused by human agency obsoletes the initial conceptual proposition of SPU as a suitable unit for planning opportunities for CEB generation, which in turn should be bequeathed on UGBS (Liu & Russo, 2021). SPU may still aid planning by defining spatial units from which CEB arise. However, delineating an SPU (and, *de facto*, an environmental space) in the case of CES is not as straightforward as in the case of other ecosystem services due to the human factor (Andersson, McPhearson, et al., 2015).

Findings also suggest that the spatial extent of environmental space is not necessarily defined by the physical manifestation of cultural practice in space. For instance, an arable surface in a wild garden in Zagreb can make an environmental space for gardening practices. However, sitting on a bench and looking at one's own garden may generate CEB—especially those identity-related—that arise through a mind interaction with the entire garden. In this case, the mental footprint of the performed cultural practice is many times larger than its physical footprint (marked by a sitting spot). Similarly, when a part of Savica Park was to be taken away for church construction, the park users opposed it because it endangered the identity-related CEB such as *place attachment*. Those CEB were formed and generated through likely repeated interactions with the park where physical footprint did not necessarily cover its entire area. Nevertheless, those very CEB could not arise if parts of the park covered by mental footprint did not exist (cf. Raymond, Giusti, et al., 2017).

Cultural ecosystem benefits

CEB are personal contributions to one's wellbeing generated through relational interactions with nature. They need to be assessed subjectively since they are unique to different people (cf. Rolston, 1997). In other words, CEB generated from the same pair of environmental space and cultural practice are likely to differ (even if slightly) between individuals because of personal preferences, desires and needs through which those CEB are perceived and valued (Banicki, 2017). It is even plausible that the same pair of environmental space and cultural practice may generate different CEB to the same person at a different time depending on their current mood or weather preferences (Chen et al., 2019). Because of such a subjective nature of CEB, where their assessment depends on personal perception and evaluation filters, no method can entirely capture all the generated CEB nor objectively classify them.

The attempts to classify reported CEB into categories (experiences, capabilities, and identities) defined in Fish, Church, and Winter's (2016) framework in chapters 5 and 6 relied heavily on the researcher's subjective interpretation. If considered qualitatively, those categories provided insights into relational connections between people and different urban ecosystems, revealing more research- than planning-related information. However, any quantitative treatment of CEB would only provide misleading information regarding the ecosystems' contributions to the wellbeing of studied groups of UGBS users since the contributions (Chan, Satterfield, et al., 2012). Quantification precludes losing critical information on the background CEB-generation process leading from relational interaction to very personal CEB. Planners should therefore be cautious when assessing and interpreting reported CEB—they can illuminate the relational connections between users and ecosystems, which can have repercussions for planning, but they cannot reveal the objective potential of any UGBS to generate contributions to wellbeing. Planners should embrace a different epistemology and re-think the role of 'data' in decision-making (i.e. from prescribing outcomes to understanding different perspectives). The complexity

of CEB further supports this in terms of dimensions of wellbeing to which they contribute.

The provisional categorisation of CEB in empirical chapters generated insights into how CEB are derived from interactions with nature. Experiences refer to meaningful discrete encounters with ecological phenomena, which are interpreted and understood in accordance with person's knowledge, cognitive capabilities, value system and mood (Church et al., 2014). Meaningful discrete encounters with nature may stimulate recurrent encounters (Beery et al., 2017), which can generate capabilities-related CEB. While some capabilities may arise even from one meaningful interaction (e.g. knowledge), repeated encounters are typically needed to generate and maintain such CEB (e.g. health benefits, dexterity). Meaningful and memorable encounters with ecological phenomena may also create symbolic associations deriving identity-related CEB. Such CEB normally require recurrent interactions (e.g. place dependence, environmental identity) but can sometimes arise from only one meaningful encounter (e.g. spiritual significance, usefulness). CEB reported by park users and gardeners suggest that each contribution to their wellbeing derived from interaction with nature might be seen through each of Fish, Church, and Winter's (2016) three dimensions: experiences, capabilities, and identities (cf. Fischer & Eastwood, 2016).

The semi-structured interviews enabled detailed responses that revealed multiple facets of those contributions, arising from a single cultural practice. For instance, each time a gardener works with land in their garden may evoke a different experience, contribute to their health (capability) and reinforce the place attachment (identity). Such simultaneous generation of CEB is akin to the notion of bundles, i.e. co-occurrence of multiple services or benefits (Andersson, McPhearson, et al., 2015; Plieninger et al., 2013), which is a possible explanation here. However, because of their subjectivity and intangibility, CEB can be only conceptually traced back to interactions between environmental spaces and cultural practices from which they arise. This allows conceiving a different explanation where the same CEB may affect different dimensions of well-being

simultaneously, instead of bundled CEB contributing conjunctly. Moreover, it is plausible that precisely a sequence of individual pleasurable experiences may at the same time forge an identity-related contribution such as place attachment. In that case, both individual experiences and place attachment can be considered CEB, although their time scale is different (single interaction vs multiple interactions).

Findings from empirical chapters further imply that individuals list some CEB while omitting others. This may be either because of personal valuing of contributions or lack of awareness of all the contributions, i.e. dimensions of wellbeing to which contributions are made, especially when they have different time scales. Revealing (nearly) all dimensions of the generated CEB would require an impractical (and currently unattainable) methodological framework. For that reason, CEB can have only a limited operational role in the exact planning practice—the planning assessment of CEB may be useful as long as the results are interpreted cautiously and qualitatively rather than quantitatively. This suggests that planning should primarily rely on data about environmental spaces, cultural practices, and their relational interactions. The frequency and diversity of performed cultural practices might serve as proxies for generated CEB and meaningful nature interactions, thus informing UGBS planning.

8.3.3. Can the "hatch and grow" strategy navigate planning for urban CES?

Although this study only tested the "hatch and grow" strategy in the research context, the outcomes allow speculation about its application in practice. The established assessment capacity of Fish, Church, and Winter's (2016) CES framework is essential for the applicability of the strategy. Employing environmental spaces, planners (and researchers) can track in which (parts of) planned ecosystems (i.e. UGBS) people interact with nature, whereas by cultural practices they can assess the form and frequency of interactions (Fish, Church, & Winter, 2016). This provides an advantageous means for monitoring the situation

in the field and amending the possibly corrupt implemented solutions on the fly. Nevertheless, those data would not be sufficient to assess to what extent planning successfully provided opportunities for meaningful human–ecosystem interactions. Those can only be determined by assessing generated cultural benefits and disbenefits in each concerned ecosystem and trends in values about nature among those ecosystems' users, which would reveal changes in the generation of contributions to their wellbeing and shifts in pro-environmental behaviour (Blicharska et al., 2017). Precisely the change in values about (urban) nature is a primary indicator of reconnection with nature (Ives et al., 2018; McEwan et al., 2020). On the other hand, changes in the stock of environmental spaces and volume of cultural practices may indicate changes in ecological conditions and, consequently, the provision of other ecosystem services (Andersson, Tengö, et al., 2015).

The synthesis of findings indicates that two principal scales of UGBS planning application can be outlined—strategic (concerned with the spatial distribution of ecosystems/UGBS) and design (concerned with individual ecosystems/UGBS). Since the "hatch and grow" strategy translates the CES concept into UGBS planning, its practical applicability depends on harmonisation with planning. On the strategic level, the strategy would facilitate that supply, spatial distribution, diversity and connectivity of UGBS at different spatial scales (city/district/neighbourhood) correspond to spatial demographics of prospective users and social and ecological functions in a way to maximise opportunities for meaningful human–nature interaction. On the design level, the strategy would ensure that the design and equipment of individual UGBS attract prospective users and support diverse and meaningful interactions with nature, which can result in a rich generation of CEB. When translated to the case of Zagreb, socialist urban planning ensured high availability of UGBS distributed per age demographic, but individual UGBS were rarely designed and equipped in a way that would support diverse and meaningful interactions with nature. The situation only worsened in the post-socialist UGBS.

The contribution of the 5P framework to explaining the links between UGBS planning and the opportunities for meaningful human–nature interactions in Zagreb implies the planning potential of the 5P factors. If a factor from any 5P factor group is accountable for the change in the provided opportunities for human–nature interactions, then manipulating that factor in the planning process should influence the provision of those opportunities. The 5P framework was developed to be self-intuitive in the application. However, in light of harmonising the strategy with planning scales, each factor should be considered on both strategic and design levels to ensure a systematic approach and high-quality solutions.

The empirical application of the 5P framework hinted that, because of its initially rather loose content and organisation, it builds on researchers/planners' experience and familiarity with concepts and principles. However, the framework might support UGBS planning and empower planners even better if it incorporated relevant advancements from scholarship and practice. This would call for integrating knowledge, principles, techniques, and best practices from the relevant fields (from UGBS, ecosystem services, human–nature connection, to nature-based solutions and other related fields). The five-factor structure allows systematic integration of best practices and useful principles, techniques and findings from various concepts and frameworks from the aforementioned fields into five groups (place, people, past, purpose, practices). The factor structure could be reinforced discriminating aspects within each factor per strategic and design levels of application of the strategy. That way, practitioners would be able to consider factor aspects relevant to the level of application and draw out valuable principles and techniques.

In this time of progressive learning about UGBS planning, management and use, the framework's continuous ability to navigate the provision of diverse opportunities for CEB generation indeed depends on its ability to be routinely updated. The updating of the framework should be a collaborative project between research and practitioner communities, by which inputs from research and practice would be evaluated, systematically integrated into the framework,

and harmonised with its existing content, which sometimes may demand its revision and amendment. That way, the 5P framework would get a more solid structure and broader content base while retaining the quality of self-intuitive consideration of the 5P factors. In addition, practitioners would be able to combine their experiential knowledge and skills with applicable insights from science and practice in local contexts and reflect on the success of applied solutions, thus enriching the knowledge base of the framework.

8.4. What lessons from different ideological approaches to urban nature planning would inform the operationalisation of CES in practice?

> *"Parks must facilitate activities. When they facilitate some activity, they become specific. It would be wrong to produce five hundred identical parks across Zagreb and expect they would be full of visitors. We had to find a way how to highlight the uniqueness of each of them."*
>
> Interviewed urban planner (71/M)

The juxtaposition of the socialist and post-socialist UGBS planning policies, practices and outcomes illuminated the advantages and deficiencies of both approaches for promoting CES. Yet differences between these planning regimes revealed more generalisable principles, namely that numerous factors need to be considered (including legacies of past planning regimes) in order to understand and enhance the generation of CES. Key insights for planning and governance for urban CES based on this study are presented below.

8.4.1. Departure from exclusively monetary prioritisation of land uses

Studies increasingly highlight the role of UGBS and ecosystem services in raising the quality of life (C. Davies et al., 2015; Haase et al., 2018), improving individual and public health (Finlay et al., 2015; Q. Wang & Lan, 2019), and decreasing financial costs of health care and facility infrastructure (Lafortezza et al., 2013; Steiner, 2014). The primary role of urban planning—optimising the physical and functional structure and organisation of the city to provide good

quality of life (Myers, 1988; Steinø, 2004)—would therefore imply an increasing role and value of UGBS among urban land uses. And indeed, cities like Vienna, Paris, and Singapore make efforts to increase UGBS areas to boost their social-ecological benefits (Mocca et al., 2020; Tan et al., 2013; Torp, 2021). This study suggests that technocratic socialist planning in Zagreb also recognised those by underpinning urban hygiene, public health and recreation opportunities through the generous provision of UGBS (Antolić, 1953; GUP, 1971).

Despite incomplete implementation, socialist plans generally treated UGBS (green infrastructure) as important as housing or traffic land uses (grey infrastructure). This resulted in an ample proportion of UGBS in neighbourhoods, which is reflected in a reportedly better quality of life in socialist neighbourhoods than in those erected later (Klarić Jelenski, 2020; Sviršić Gotovac, 2009). The post-socialist shift in planning that decreased the provision of UGBS in Zagreb resulted mainly from an ideology of distancing from socialist "overplanning" (79/F/planner) expressed via deregulation and concessions to private capital. UGBS provision became unprofitable, irrespective of its social and economic benefits, which often cannot be expressed quantitatively and financially. Consequently, the residents of post-socialist urban sections had fewer opportunities for interaction with nature, generation of contributions to their wellbeing, and instilling values about nature in their children. In addition, post-socialist urban governance did not recognise links between the availability of UGBS and health care costs, which would prompt reconsideration of the planning attention paid to UGBS, even from a financial perspective.

With relatively good access to UGBS, the average citizen of modern Zagreb can thank the city's planned expansion in the second half of the 20th century when most city sections were built. However, if socialist planning norms and principles were revisited from social and ecological instead of political and ideological perspectives in the 1990s, residents of post-socialist sections would likely enjoy the same opportunities for interaction with nature and other benefits as the residents of socialist neighbourhoods. Yet, the post-socialist policy-makers and planners were fixated on embracing a new planning paradigm based on private

property and private investments that they inadvertently discarded elements of socialist urban planning that proved beneficial for ecological and social outcomes. This highlights the need to be sensitive to histories of planning, which may often have their conveyable advantages.

On the other hand, the notion of values that are at the heart of neo-liberal capitalist ideologies creates fundamental issues for planning since ecological and social outcomes cannot easily be measured or incorporated into markets. If contemporary urban governance more generally would acknowledge the importance, benefits and advantages of urban nature, which may not always be tangible and quantifiable, it would be reasonable to expect an increase in the welfare and quality of life. With research increasingly illuminating the multifunctional capacity of urban nature, UGBS have good prospects of inclusion into modern urban planning, contributing to fighting the alienation from nature and achieving urban sustainability and resilience (C. Davies et al., 2015; Hansen, 2018). Nevertheless, more research is needed to unravel how intangible values may be better captured and integrated into modern urban planning.

8.4.2. Ensuring available UGBS across urban space

Whereas abundant UGBS will not necessarily reverse the trend of diminishing contact with nature (Lin et al., 2014), their spatial availability is a vital precondition for opportunities for meaningful human–nature interactions in cities. Studies generally agree that distance to UGBS is an important determinant of park use (Giles–Corti et al., 2005; Zwierzchowska et al., 2018) and its significance seems to be rising with the diminishing contact with nature (Soga & Gaston, 2016). In addition, contemporary cities increasingly set quantitative planning goals for the proportion of UGBS in their total areas (Mocca et al., 2020; Tan et al., 2013; Torp, 2021) and call for ensuring access to UGBS within a walkable distance from housing units (Konijnendijk van den Bosch, 2021; Q. Wang & Lan, 2019). The re-recognition of quantitative goals in UGBS planning

comes half a century after socialist urban planners started greening relatively grey industrial cities.

The case of Zagreb can provide valuable insights into how quantitative UGBS planning was implemented in practice and how this influenced residents' quality of life over time. First, parks, children playgrounds and sports and recreation grounds in socialist neighbourhoods were planned to be available within walkable distance and dimensioned to provide the minimum area per prospective user (distinguished per age groups). Second, neighbourhoods were planned spacious—in accordance with the somewhat adjusted Corbusian concept of 'towers in the park'—by nesting buildings in a vegetated matrix (which covered 30–40% of the neighbourhood area). While Corbusian concept was often criticised for resulting in social problems and ironically reduced contact with nature in western cities (Dela Cruz, 2014; Monclús & Díez Medina, 2016), its Zagreb iteration tended to be linked with the desirable quality of the urban environment and life because of the protection of open space between built-up areas (Klarić Jelenski, 2020; Svirčić Gotovac, 2009).

Spatially distributed UGBS specialised for particular kinds of human–nature interactions (e.g. parks, children playgrounds, sports and recreation grounds) combined with the all-present Corbusian greenspace matrix appears to be a vital precondition for a high-quality living environment that would stimulate human–nature interactions and co-production of CES. Examination of this approach in Zagreb illuminated several planning-related insights. First, CES emerging from the Corbusian matrix evolved and 'grew' over time as landscapes became more diverse through natural succession and additional planting of trees and shrubs, and creation of varied ambiences, which stimulated diverse cultural practices. Interviewees in this study recognised that urban landscapes planned in the post-socialist period displaced nature due to the reduced minimum distance between buildings, and that this decreased the quality of life. As one UGBS user from Savica (67/F) put it, residents ended up "*looking through windows into their neighbours' bedrooms*". This further discouraged them from interacting with vegetated

interspaces from their windows and balconies while adequate outdoor opportunities were not provided.

Second, landscape garden design requires less maintenance (and lower associated costs), which was why socialist authorities preferred it. But it also facilitates more diverse interactions between users and nature than formal garden design, especially when the latter includes flower beds with seasonal plants but no dense woody vegetation. Third, disregarding infrequent maintenance, there was only one management regime for all UGBS in Zagreb (see Chapter 7). However, observing the ecological processes and principles (such as connectivity or different mowing regimes) in UGBS planning, design and management might increase the biodiversity of such spaces and restore urban wildlife. This would increase the probability of incidental nature experiences and motivate residents to seek intentional nature experiences and generate CEB that will influence their values about nature (Beery et al., 2017; Folmer et al., 2019). From that point, the proximity of specialised UGBS and possibly even their connectivity with the Corbusian matrix might stimulate residents' visitation to UGBS. Hence the fourth insight—the connectivity within the Corbusian matrix might enable and motivate various cultural practices that require high energy consumption (e.g. running, cycling), thus contributing to public health goals.

Many of these insights may inform modern approaches to greening cities. Modern efforts to reclaim streets from motorised traffic for pedestrians and cyclists (Gehl, 2010; Madzule–Bajare, 2012) give rise to reimagining cities to include more nature. The Corbusian matrix may be a desirable solution as it underpins various ecosystem services (from CES to stormwater infiltration and ventilation to habitat for urban wildlife). Considering Zagreb's spatial structure, the lessons might be integrated into the increasingly popular biophilic urbanism (Cabanek et al., 2020; Downton et al., 2017; Thomson & Newman, 2021) for its implementation in cities lying around the middle of the land-sharing-sparing continuum (Collas et al., 2017). This position includes cities with medium building density where apartment and high-rise buildings can be surrounded by green spaces corresponding to the Corbusian matrix. Similarly, the insight could

also inform practical means for implementation of the 3-30-300 rule for urban planning, according to which every home should have a view at no less than three trees and be no more than 300 m away from the nearest UGBS while at least 30% of the area of every neighbourhood should be covered by tree canopies (Konijnendijk van den Bosch, 2021).

8.4.3. Co-productive approach to planning diverse UGBS

This study showed that despite surroundness with nature and availability of specialised but generically designed UGBS, residents of socialist neighbourhoods engaged in grassroots initiatives to modify the design and equipment of the Corbusian greenspace and even create new, informal types of UGBS, all in order to create alternative opportunities for interaction with nature. While the socialist authorities never embraced and planned collective urban gardens despite the demonstrated need and instances from other socialist cities, the post-socialist city authorities administered them unilaterally, leaving out prospective users' input and thus disabling the generation of many CEB enabled in wild gardens. The extent of prospective users' needs' influence on CES production and the generation of CEB raises the question of whether planners should rethink the 'knowledge' or 'data' used to make decisions and plans. Rather than decisions being made at a high and abstract level disconnected from residents' experiences of landscape, a co-productive UGBS planning could provide substrate for diverse environmental spaces and enable cultural practices that arise from users' preferences, desires and needs, thus facilitating the generation of valuable, personalised CEB (cf. McGinlay et al., 2017).

The residents' grassroots initiatives indicate their capacity to engage and contribute to CES-oriented UGBS planning. Those residents proved to be active stewards and co-producers of urban nature precisely in places where planning failed (non-implemented and neglected spaces). Citizens' capacity to envisage "fertile" environmental spaces is well-reflected in the most recent initiative to establish a public urban orchard in Jarun Neighbourhood. Even though lacking

planning knowledge and skills, citizens have a unique and crucial role to play in UGBS planning because of their relational connections with urban ecosystems (West et al., 2018), which correspond to CES and make those ecosystems valuable to individuals (Fish, Church, & Winter, 2016). There are numerous *civic ecology practices* documented in the literature that could inform and help shape a local co-productive approach considering local specificities, level of citizens' interest for participation, their knowledge, and both planners and citizens' participatory skills (Krasny et al., 2015; Krasny & Tidball, 2012; Mumaw, 2017).

The co-productive approach would engage citizens as equal participants in the planning process. Their involvement in planning, designing, managing and monitoring processes could be guided by planners who possess relevant professional knowledge and skills. This would not only create fertile conditions for meaningful nature experience and CEB generation but also increase ecological and civic literacy (Colding et al., 2020) and ensure continuous monitoring of the state of an ecosystem and its capacity to provide CES. Given that CES are perceived more easily and directly than other services, engaged citizens could timely recognise changes in the ecosystem and prompt decision-makers to appropriate action. That way, instead of oblivious consumers, the co-productive approach would create "engaged stewards that can help redirect urbanisation into a driver of positive change for humanity and the life-supporting systems that we depend upon" (Andersson et al., 2014, p. 445).

Planners' role in planning and designing UGBS would be two-fold. On the one hand, they would design UGBS to be diverse enough to correspond to the plurality of prospective users' preferences, desires, and needs and stimulate diverse cultural practices. On the other hand, they would reconcile and integrate multiple socio-cultural, ecological and infrastructural demands to provide the best overall solution for the local community. In that sense, the greater space allowance for UGBS would enable a greater diversity of environmental spaces and satisfy more demands, thus generating varied ecosystem services.

8.4.4. Enabling incidental encounters with nature across urban space

Whereas the provision of more UGBS is the most straightforward approach to mitigate diminishing contact with nature in cities (Soga & Gaston, 2016), the empirical study by Lin et al. (2014) suggested that a simple increase in the availability of UGBS may not be accompanied by the increase in visitation and individual's nature orientation. Instead of simply providing UGBS across urban space, planners should aim to enable meaningful interactions with nature. Beery et al.'s (2017) Incidental Nature Experience Cycle model was incorporated into the "hatch and grow" strategy exactly to supplement planning for CES with the means to reverse the trend of diminishing contact with nature. The model postulates that meaningful incidental encounters with nature may stimulate recurrent interactions, which are prerequisites for creating most symbolic associations with nature required for amending people's values for nature (Urquhart & Acott, 2014). However, in situations where already alienated citizens are to be reconnected with nature, the supply of UGBS must be complemented with strategically located opportunities for meaningful nature experience.

The model is applicable at both strategic and design levels. On the strategic level, the model could locate different types of UGBS within the planned area, help identify and incorporate into the UGBS network the existing locations that could stimulate incidental nature experience, and achieve a certain degree of connectivity between separate UGBS. Then on the design level, it would navigate the internal arrangement and diversity of UGBS and seek creative spatial solutions for stirring up incidental nature experiences in public urban spaces. Since citizens alienated from nature will likely not go to UGBS, such as public parks or recreation grounds, planners should provide nature experiences in other public spaces they use—e.g. in transitory spaces to work, school or supply (Beery et al., 2017). Those may include street tree lines, shortcut passages through UGBS (e.g. bridge across a stream or lake or alley through a forest-park), small green or blue spaces interacting with atmospheric conditions (e.g. ponds creating attractive reflections), or small vegetated or water surfaces in large public spaces like squares.

8.4.5. Plurality of data sources, methods and scientific knowledge

Irrespective of whether implementing the co-productive approach or not, planners require relevant field data and information for any successful planning endeavour. Fish, Church, and Winter's (2016) CES framework seems well-designed to capture environmental spaces, cultural practices and CEB within urban ecosystems. The demonstrated relevance of the 5P framework for explaining links between planning decisions and the provided opportunities for meaningful human–nature interactions suggests that planners could use the framework to inform planning decisions and manipulate the provision of such opportunities. The established need for combining multiple research methods to capture elements of the CES cascade implies a similar need in practical context as different techniques draw different aspects of the data complementing each other and providing a better foundation for conclusions. Field observation can be combined with interviews and surveys as well as participatory methods, which would help gather geospatial data. Here I advance the potential of public participation geographic information system (Dickinson & Hobbs, 2017; Rall et al., 2019), which may help gather more accurate spatial data about environmental spaces in the context of deductions derived in the previous section.

Considering the fast pace of scientific knowledge production and the increasing need for research–practice transfer, planning UGBS for CES must be grounded in contemporary science (Frantzeskaki et al., 2021). While socialist planning principles and norms were grounded in the then science, they were updated slowly and implemented only in planning new UGBS. Since then, the research field of UGBS use, planning and management flourished, yielding theoretical and practical knowledge that should underpin contemporary UGBS planning (J. Wang & Banzhaf, 2018). However, it seems that knowledge transfer to practice only slowed down in post-socialist Zagreb. The preceding sections illuminated that openings for better inclusion of UGBS in urban governance lie exactly in grounding policies in current scientific knowledge and strengthening efficient research–practice transfer.

Knowledge from several fields is relevant. UGBS use, planning and management field can provide valuable principles, approaches and methods to planners and underpin planning of multifunctional green infrastructure facilitating provision of various ecosystem services (Di Marino et al., 2019). The increasing integration between UGBS, CES, and human–nature connection fields may provide valuable insights into ensuring opportunities for diverse cultural practices and generation of CEB that could overturn the trend of diminishing contact with nature (Hermes et al., 2018; Summers & Vivian, 2018). Finally, applied research using data and good practices from UGBS planning and management can evaluate and validate theoretical proposals, especially if the former comes from different spatial, cultural and socio-economic contexts, and yield invaluable insights for urban governance (Kosanic & Petzold, 2020).

8.5. Suggestions for future studies

"Planners and other experts often dismiss citizens' comments as 'anecdotal' and tend to aim at educating citizens rather than learning from them."

Maija Faehnle (2014, p. 13),
urban environmental scientist

This study spanned several different themes, concepts, green and blue spaces, periods and urbanistic styles. As such, it revealed numerous intersecting areas where research attention is needed. The suggestions for future studies are grouped in four themes: applied research of the "hatch and grow" strategy, ideological influences on enabling CES, CES enabled through the grassroots initiatives, and turning incidental nature encounters into intentional nature experiences.

8.5.1. Applied research of the "hatch and grow" strategy

Cultural ecosystem services represent but one conceptualisation of human–nature relationships. Different settings of many other concepts evoke distinctive understandings and insights that may still be relevant in studying and implementing CES in practice. Even though grounded in the CES concept, the "hatch and grow" strategy aims to bridge over various human–nature relationship conceptions for the sake of building an all-encompassing approach to planning urban nature to enable meaningful experiences of nature, generate diverse CEB and reconnect people with nature. Many useful principles, techniques and findings from various concepts and frameworks are being

developed within scattered research fields—from ecosystem services, human–nature connection, UGBS and urban green and blue infrastructure, to nature-based solutions, and other related fields (Beery et al., 2017; G. Brown, 2008; Díaz et al., 2015; Faehnle et al., 2015; McEwan et al., 2020; McLain et al., 2014). This research recognised strategy's 5P framework as a hub of relevant, useful, and applicable contributions from all those fields as well as good practices developed by practitioners.

Integrating research and practice contributions into the 5P framework was conceived as a continuous collaborative process between researchers, urban planners and other relevant stakeholders. This opens up a niche for research focused on identifying and integrating those contributions into the 5P framework and harmonising them with already incorporated contents, which may include a critical re-evaluation of integrated concepts, principles and techniques. Furthermore, such a continuous build-up of the 5P framework necessitates its constant testing and calibration to ensure viable and smooth application in planning and research. In line with that, the collaboration between researchers and practitioners calls for applied transdisciplinary research (Lafortezza et al., 2017; Tress et al., 2005) and more vigorous two-way transfer of knowledge and practice between research and practitioners' communities (Canedoli et al., 2017).

Even if currently simple in terms of integrated concepts, principles and common planning knowledge, the 5P factors proved adequate in explaining the conditions that enabled the performance of observed and reported cultural practices and the generation of reported CEB. This implies that it might be possible to outline combinations and configurations of factors that may provide encouraging and discouraging conditions for certain cultural practices. More research is needed to trace links between variables within each factor and the performance of various cultural practices in relation to the generation of cultural benefits and disbenefits (Fischer & Eastwood, 2016). Moreover, certain combinations of 5P factors might have different combined effects on opportunities for cultural practices from individual effects of constituent factors. Nevertheless, advancing knowledge about relationships between CES and 5P

factors will help planners better align those factors and provide favourable conditions for emerging cultural practices and environmental spaces and even amplify benefits and inhibit disbenefits.

8.5.2. Regime and ideological influences on enabling CES

This research only scratched into the relationship between socio-political ideologies and the provision of CES from UGBS. The study of Zagreb yielded rich insights into how urban nature was approached within Yugoslav planning and how socialist and post-socialist planning differed. It confirmed conclusions from other studies that socialist regimes provided UGBS abundantly compared to non-socialist rules, but it could not contextualise CES-related findings to those in other socialist cities due to the lack of relevant studies. Hence, more research is needed on the UGBS-provided opportunities for nature experience and CEB generation.

The study explored the CES provision in Zagreb, which was planned as a representative socialist city. Research of planning for CES in smaller Yugoslav cities would complement the picture of differences between urban planning in representative and provincial cities. This could also illuminate how ideological stances, planning ideas and understandings of urban nature were disseminated between centres (such as Zagreb or Belgrade) and more peripheral settlements. In addition, comparisons of urban nature provision and CEB generation with other East European cities would outline similarities and differences between Yugoslav and other socialist and post-socialist regimes, potentially revealing important insights for planning along the cross-cultural axis.

Empirical chapters outlined differences in the availability of urban nature and opportunities for meaningful interactions between Corbusian and non-Corbusian neighbourhoods. This created an opening to explore historical and present-time perceptions of nature connectedness, contributions to residents' wellbeing and pro-environmental behaviour between those two types of neighbourhood layouts. Additional studies would shed light on the connection

between physical proximity to nature and meaningful nature interactions, thus providing valuable contributions to the 5P framework.

8.5.3. CES enabled through the grassroots initiatives

While this study was focused on formal UGBS planning, it touched upon several grassroots initiatives oriented towards preserving existing UGBS or creating new ones. The main actors in most of such initiatives were residents opposing official plans of transforming UGBS or converting them into non-UGBS land uses. Occasionally references to those initiatives in conducted interviews implied that motivation for residents' activism could be traced to CES. Cases outlined in this study (e.g. residents protesting against the church construction in the park and park redevelopment, gardeners fighting to preserve wild gardens) suggest that relational connections between citizens and green spaces (which can be identified as multiple CEB) and values about those spaces are precisely the drivers of such initiatives.

However, literature reviews of CES-related research showed that most papers explored mapping, assessment and perceptions of CES and their relationship with UGBS and landscape features (Cheng et al., 2021a; La Rosa et al., 2016; Milcu et al., 2013), while studies about how CES influence human behaviour, especially actions and activism are missing. A step forward was done in the community gardening field (Gladkikh et al., 2019; Torres et al., 2018); however, CES-driven activism is still largely unexplored. Examination and understanding how and to what extent CEB can drive people's behaviour might provide a unique perspective into human–nature relationships and potentials for environmental stewardship, generating insights for research and practice.

8.5.4. Turning incidental nature encounters into intentional nature experiences

The "hatch and grow" strategy drew considerably on Beery et al.'s (2017) Incidental Nature Experience Cycle model, which states that incidental contact with nature may stimulate intentional encounters and thus help reconnect people with nature. However, we still need more empirical data clarifying how incidental experiences are turned into intentional ones, how that process relates with different levels of nature connection and disconnection (and different age groups), and what spatial forms of urban nature experiences can induce the cycle and why. Since citizens alienated from nature are not expected to visit typical UGBS, further research should establish what kinds of nature-based solutions that would arouse interest for urban nature can be implemented in public urban spaces such as streets, squares or other infrastructure.

Street tree lines seem like an obvious and straightforward solution, which can also have an essential role in increasing connectivity between UGBS. This raises a further question of distance between opportunities for incidental and intentional nature encounters—would the proximity of a UGBS to locations of incidental nature experiences stimulate pursuing the intentional encounter. There is also a question of whether any available UGBS would encourage multiple intentional encounters or planners should design stimulating green–blue environments aiming exactly at reconnecting alienated citizens with nature. All those questions show us that our journey to realign with nature is still at the beginning. Written more than fifty years ago, words of the American naturalist and environmental activist John Hay (1969, p. viii) are still equally valid: "We have a great deal of exploring to do in order to find the place where we share our lives with other lives, where we breathe and reproduce, employ our sight, and join the breadth of chances not as separate, unique entities with doomsday on our docket but as vessels for universal experience."

8.6. In conclusion

This study has shown that, even though the CES concept was never explicitly used in Zagreb's urban planning, the opportunities for human–ecosystem interactions leading to the generation of CEB were facilitated by urban planning documents and practice. This was more emphasised in the socialist period when the then socio-political and ideological context purposefully utilised the urban nature to support workers' wellbeing and yield broader socioeconomic benefits. Striving towards the 'city in the park' model, socialist urban planning provided abundant UGBS across Zagreb. While the financial situation and technocratic approach often hampered the implementation of idealised plans, the opportunities for co-production of CES provided then remain unattainable. Even though environmental concerns increased since the socialist period, deregulation of planning and stimulation of private investments in the transitional context neglected the development of unprofitable spaces. Consequently, contemporary residents of Zagreb can still thank for the available opportunities for the generation of CEB primarily to the socialist planning approach.

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