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Urban Natural Areas, from Nature Conservation to Well-being Assets

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Abstract

The increased density of human population globally and the negative impact of some human actions put pressure on the components of natural capital and its ability to regulate and support the effects of human activities. The high complexity of urban systems, multidisciplinarity of issues and multiple impacts they face (resulting from overpopulation, pollution, climate change and, more recently, pandemics) pose an increased challenge for the management of urban agglomerations. In this context, terms such as resilience and sustainability or environmental protection are increasingly used in public administrations. In this review, we want to highlight the importance of green urban areas in providing cultural and regulating benefits to society and the role students' play in identifying and raising awareness on the services that natural capital offers to human communities. The reviewed literature emphasizes the multifunctional role of urban natural areas, including biodiversity conservation and provision of benefits essential for human population well-being. Despite the general recognition of the positive role of civic engagement for the development of highly qualified and better adapted human resources, our review revealed the limited civic engagement of universities in assessing and raising awareness on the role of green areas for urban communities. We also noticed an increased interest of universities in growing their impact on society and giving students opportunities for civic engagement.

Keywords: urban natural areas, stakeholders, ecosystem services, students, social factor.

JEL Classification: I310.

1. Introduction

The highest rate of human population density is currently found in cities. It increased to 47% by 2000 and is expected to reach 60% by 2030. The increase will be predominant for the urban environment and is caused by the migration of the

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population from the rural area, which will lead either to the formation of new cities or to the increase of the surface of the existing cities (Decker et al., 2007; Montambault et al., 2018).

The growth and development of urban territories lead to a reduction in the area covered by the natural capital and, consequently, to a decrease in the supply of ecosystem services it provides to the human population. More and more countries or cities have called for local, national, or regional actions to enhance the services provided by green urban areas (Bertram & Rehdanz, 2015). To minimize the impact on the quantity and quality of ecosystem services, development and enhancement of the "green infrastructure" of urban agglomerations is essential (Wagner et al., 2019). "Green Infrastructure" is a general term for a network of green areas, conservation sites (e.g., urban protected natural areas) or water bodies, able of delivering a wide range of benefits to people, in addition to conserving the natural capital (Grădinaru & Hersperger, 2019).

The scientific literature highlights the importance of green urban areas for the well-being of the inhabitants. Many articles in medicine and psychology emphasize the connection between green areas and the inhabitants who benefit from the services offered. Research shows that green areas positively affect human health by reducing stress, improving health and increasing recovery from certain diseases and longevity, etc. (Bertram & Rehdanz, 2015). Therefore, their role is not only to conserve nature but also to improve the well-being of the human population. Studies also show a link between population density in cities and the demand for green spaces. At a particular value of the human population density, the surface of green space per capita may change, with effects on the sustainable development and resilience of cities (Westerink et al., 2013; Wolff & Haase, 2019).

It is widely acknowledged that natural capital provides several benefits that condition human well-being, sustainable development and resilience of urban agglomerations, and that human influences affect each system and natural flow (Lowe et al., 2009; Rădulescu et al., 2016). This is why the active involvement of the social factor is required in urban management and governance. Apart from this, a conceptual change from sectoral issues such as air and water pollution or overexploitation of natural resources to a more complex approach addressing global problems such as climate change, nitrogen and carbon circuit, biodiversity and multidisciplinary and multi-stakeholder perspectives is essential. The perceptions and values of stakeholder categories differ with their interest and the social, cultural, environmental and political context, and can influence the use of natural capital components. Their involvement in the management of natural resources allows the identification of trade-offs and conflicts. The identification and analysis of stakeholder groups must be made in such a way as to avoid the marginalization of certain categories and to be fair for the representation of their various interests (Prell et al., 2009).

Raising awareness of the benefits that natural capital offers to the human population is seen as an opportunity to achieve sustainable use of natural resources. It focuses on the values that nature provides to the people and integrates social,

ecological, and economic aspects. The increased impact to which natural capital is subject and the complex interrelationships between humans and nature challenge the collaboration of specialists in social, economic, political, and natural sciences for the sustainable management of coupled natural-social-economic urban systems. In these interdisciplinary efforts, ecologists play a major role (Lowe et al., 2009).

In this context, the interest of universities is focused on identifying and developing new ways to provide civic engagement opportunities for students, faculty, and the civil society. Educational institutions transition from the theory (e.g., the impact of resource exploitation or pollution on the system's capacity to supply ecosystem services) to a more applied approach includes various forms of active civic involvement. Whether it is the encouragement of service learning activities or the development of OPENLABs, it means the engagement of a large number of undergraduate, master, or doctoral students and professors in civic actions. In this way, the universities may bring a considerable contribution in terms of identification and valuation of the benefits offered by the natural capital. Service learning provides students opportunities to develop civic engagement skills. By working with community members in similar or different fields, students develop group, organizational, and interpersonal skills. Service learning motivates students to support their own ideas concerning a particular topic (Helicke, 2014). The OPENLABs initiative contributes to the development of participatory, inclusive, and open universities in their territory, serving the interests of citizens at local, regional, and international levels by connecting civil society representative members with the university to find together solutions to major common challenges (OPEN LAB, 2021).

2. Problem Statement

Considering the complexity of issues raised by the interrelationships between nature and society and given that the social factor cannot be excluded from the study of natural capital, and from the process of identification and valuation of the benefits provided by urban natural areas, universities join and move towards this approach. The involvement of universities in the current context brings opportunities for the wise use of natural resources, sustainability and the resilience of cities, not only by contributing knowledge, but also by practical application.

In this context, in this review we aim to present a critical analysis of the literature on the provision of cultural and regulatory services by urban green areas and the involvement of human communities or stakeholders from the urban environment in their identification and evaluation. We keep a particular focus on the participation and the role that universities play in the process of identifying green urban areas and the benefits resulting from their involvement.

3. Research Questions/Aims of the Research

Acknowledging that urban natural areas not only play a role in biodiversity conservation, but they can significantly contribute to economic well-being, social

integration, and human health, this paper aims to answer, based on the analysis of the literature, the following questions:

- What are the main cultural and regulatory benefits provided by urban natural areas?
- How can they be engaged, and what is the role of students in identifying, evaluating, and raising community awareness of these benefits?
- Do universities, and especially, students benefit from their involvement in such processes?

4. Methods

To answer the research questions, we performed a critical analysis of the literature. We search the Web of Knowledge database using on the following keywords: urban natural area* OR urban green area OR green infrastructure OR urban terrestrial area AND importance OR relevance AND cultural services OR regulating services AND students OR universities AND Openlab AND service learning OR awareness raising OR civic engagement NOT supporting services NOT production services NOT habitat services.

We examined the geographical areas in which the research was realized, the journals where they were published, the type of benefits provided to the human population, and the involvement of students and universities. We based our research on generally accepted meaning of notions. According to the definition given by the Millennium Ecosystem Assessment, ecosystem services are defined as the benefits that the human population obtains from nature in the form of tangible or intangible goods (MA - Millennium Ecosystem Assessment. Ecosystems and human well-being: synthesis report., 2005). Regulating services incorporate how ecosystems control or modify biotic or abiotic parameters that define the biophysical environment around the people (Acharya & Maraseni, 2019). Cultural services are a subcategory of benefits with tangible (recreation and tourism) and intangibles values (spiritual enrichment, cognitive development) (Brown et al., 2015; Maczka et al., 2019).

Kovács et al. (2015), citing the global initiative TEEB (The Economics of Ecosystems and Biodiversity), define the term "stakeholders" as individuals, groups, or organizations that have an interest in how certain ecosystem services are used or managed (Kovács et al., 2015). Students can be considered an important category of stakeholders, but the role of their involvement should not be limited to that. We search for identifying different ways of engaging students in the process of identifying, evaluating, and raising awareness of the benefits green urban areas provide. We search for educational formats, such as service learning and OPENLABs, because they are frequently cited as offering students the chance to apply practically all the theoretical knowledge, stimulate students' active involvement and critical thinking to solve problems of today's society.

We expect that in the critical analysis stage of the literature, we will also identify how universities participate, especially by involving students in stages that include identifying or evaluating the benefits provided by natural urban areas,

awareness raising, or civic involvement. This is why we introduced the terms "students, universities, service learning, awareness raising, civic engagement" in the search string.

Our research does not include the papers published in national languages, in reports or conference papers. Still, we believe that our selection method covers most of the relevant literature available in the field.

5. Findings and Discussions

5.1 What are the Main Cultural and Regulatory Benefits Provided by Urban Natural Areas?

A total of 29 out of the 31 studies under analysis were carried out in cities and capitals from countries or regions with a high index of human development (according to the UN classification), in densely populated areas: 19 works in Europe, six in Asia, and three in cities or regions in North America. Two papers address natural areas in cities and the benefits they provide to the human population in general, without a particular case study. Most papers have been published in Sustainability (10), Urban Forestry & Urban Greening (6), and Landscape and Urban Planning (4). The Journal of Cleaner Production and Urban Ecosystems each published two papers, while other journals (e.g., Sustainable Cities and Society, Agriculture and Agricultural Science Procedia, Handbook on Green Infrastructure: Planning, Design and Implementation, Journal of Land Use, Mobility and Environment, Ecological Indicators, Materials Science and Engineering) have published one paper each.

As expected, all the analysed studies identified cultural or regulatory benefits offered by green urban areas. These include climate and temperature regulation (8 studies, 24.8%), water and precipitation regulation (8 studies, 24.8%), air quality regulation (7 studies, 21.7%), storage of chemical elements in soil or biomass in urban natural areas (4 studies, 12.4%). In all 31 papers, the benefits provided by green urban areas to the human population were identified through a series of social methods such as questionnaires, surveys, interviews, or workshops. Only 15 scientific papers (46.5%) assessed the specified ecosystem services using biophysical, social, or economic methods.

The revised literature highlights that green urban natural areas are an oasis of recreation (34.11%) for local communities and offer benefits for tourists and businesses (Terkenli et al., 2020; Terkenli et al., 2017). Among the roles of green areas, sanitation is the most important (15.5%), contributing to the health of the city's inhabitants. In the current pandemic context, the locals' perception regarding the sanitary role of urban areas has changed (Bellezoni et al., 2021; Carpentieri et al., 2020; Vaeztavakoli et al., 2018). As quarantine led to limited social and physical contact, isolation had a negative impact on physical and mental health. Because restrictions have influenced long-distance movements of the human population, the existence of urban green areas has provided the local community with several benefits for physical and mental health (Ugolini et al., 2020).

Specialized studies show that people who regularly visit green areas are more likely to report better health than those who do not (Xie et al., 2020). Grima et al. (2020) point out that a part of the human population perceives green urban areas as places of recreation in times of global chaos. In addition to the mental health, urban and peri-urban green areas benefit the cardiovascular health and lung function. However, additional research is needed to understand the effects of these areas on the COVID-19 pandemic, but we can say that the demand for ecosystem services provided by green areas for the well-being of people has been growing continuously lately (Grima et al., 2020).

5.2 How Can They Be Engaged, and What Is the Role of Students in Identifying and Evaluating Ecosystem Services and Raising Community Awareness of These Benefits?

Our review has highlighted a low concern for student involvement in actions and researches concerning the importance of urban green infrastructure. The participation of students to identify the services provided by natural urban areas was found in a single paper (Gavrilidis et al., 2020) and was based on the application of survey. The students had the role of a survey plot among other categories of identified stakeholders. However, the literature emphasizes that student engagement as a category of stakeholders and their active participation may bring value added, both in identifying the role of green urban areas and in their management (Argento et al., 2020; North American Association for Environmental Education, 2017). The academic community and students can contribute to identifying and evaluating the benefits provided by green urban areas, not only from the perspective of stakeholders (Gregory et al., 2020). Their engagement in planning and development of green urban infrastructure, through service learning activities or OPENLABs, may allow the development of skills, such as applying knowledge of ecology at the local level, developing and implementing environmental policies in urban areas, organizing time and resources to perform tasks or entrepreneurial skills (Bendt et al., 2013). Moreover, Nugroho (2017) shows that students involved in service learning activities have identified appropriate solutions to the today's society problems.

According to the literature, the implementation of the concept offers multiple pedagogical and managerial opportunities. The activities carried out through service learning are among the high-impact practices known to increase the retention of notions through the active involvement of students (Argento et al., 2020). Learning of this type has been applied in a wide variety of subjects and courses, such as writing and composition, financial education, engineering, psychology, science and mathematics, accounting, healthcare, geography, political science, public relations, and teacher training (Nugroho, 2017). Due to the links between ecological, social, and economic systems, students can understand and conceptualize the complexity of the interrelationships and the holistic nature of the socio-economic and ecological systems so that they can contribute towards

resilience and urban sustainability, realizing that their voices and actions also matter (Helicke, 2014).

Following the service-learning approach, students can be involved (e.g., through mini research projects, debates, social surveys, interdisciplinary team activities) in different activities, from identifying and assessing the benefits offered by green urban areas up to communication and dissemination of the results to stakeholders. They may apply different social, biophysical, or economic methods and find solutions for socially acknowledged needs. Cooperation with specialists and students from the same or other fields of study represents another opportunity for their professional and civic development. Similarly, OPENLABs' activities aim to encourage students' and citizens' engagement to find solutions to local problems, promote civic values such as solidarity and equality, combine academic content with practical experience for students (OPEN LAB, 2021).

5.3 Do Universities and Especially Students Benefit from their Involvement in such Processes?

No studies have been identified showing the involvement of academia, apart from Gavrilidis et al. (2020), in which students participated as stakeholders in the benefit identification stages. However, universities have been more and more interested in civic activities, understanding that they can contribute to planning and promoting sustainable and resilient cities and gain multiple benefits for students and professors. Universities have the necessary technical infrastructure and human resources to support local authorities and play an important role in urban planning and development of urban strategies. The involvement of their infrastructure, researchers and students can become an advantage in transforming urban space. However, studies that describe the impacts of the university are weakly connected to urban development (Fernández-Esquinas & Pinto, 2014).

Still, academic performance is a predictor of health, well-being, civic engagement, and socio-economic status in adulthood (Browning & Rigolon, 2019). The benefits that students can have from urban green areas are multiple. The academic performance itself is related to green urban areas. Some studies identified that students who live or teach on campuses with green areas have better scores on their exams than other students (Browning & Rigolon, 2019; Leung et al., 2019). Moreover, built environment education includes participatory processes that facilitate group action and action competence, it provides a holistic framework in which young people can explore nature, integrate multiple capabilities, and think about care of the social, cultural, and natural environment (Derr, 2018;Leung et al., 2019). Soon, service-learning will consolidate a productive teaching methodology that takes students beyond the classroom to engage with and address actual community needs (Chambers & Lavery, 2017).

Whether we are talking about students, teachers, or civil society, all categories benefit from exchanging knowledge through service-learning or OPENLABs. Through the active involvement of students in civic activities, they become more aware of the importance of nature in the urban environment for the well-being of

the human population (Argento et al., 2020). By actively participating in service learning stages or OPENLABs, a bridge is created between students, academics, practitioners, and people. Among the opportunities that students have, the application in practice of theoretical knowledge, the development of managerial, organizational, and communication skills, exchanges of experience, the possibility of affirmation are often highlighted (Helicke, 2014). The literature shows that after participating in service-learning activities, students gain greater confidence to apply theoretical notions acquired in courses, develop skills for the future job, have a higher interest in civic engagement, and even widen their general knowledge (Ellerton et al., 2015). Therefore, service-learning gives benefits to the students as future employees and future employers who will benefit from highly qualified human resources in the team. Another benefit that students receive through such learning activities is their intentions to engage in future volunteer activities. Ellerton et al. (2015) show that a third of students participating in service learning, surveyed in their paper, are interested in participating in volunteering in their community in the future. Civic engagement of students in identifying, evaluating, and raising community awareness of benefits provided by green urban areas allows students to change their perspectives and maybe their life. It opens the opportunity to explore real life situations, boost their leadership skills and apply the newly gained skills and knowledge by creating impactful projects aimed to solve acknowledged social needs.

6. Conclusions

The reviewed literature emphasizes the multifunctional role of urban natural areas, consisting of conserving species and habitats and providing benefits essential for the human population well-being. Despite the general recognition of the positive role of civic engagement for the development of highly qualified and better adapted human resources, our review revealed the limited civic engagement of universities in assessing and raising awareness on the role of the green areas for urban communities. By implementing the concept of service learning and participating in OPENLABs activities, students can translate the theoretical knowledge into practice.

An increased interest of universities to give students opportunities for civic engagement was noticed. Nevertheless, further efforts are needed if universities are to increase their impact on society. They have to adapt their curricular approach, develop and implement new educational formats, encourage collaborative (mini)research projects and activities (e.g., debates, social surveys, interdisciplinary team activities) that allow students to be actively involved, explore real-life situations, draw conclusions, learn from experience and get fresh insights about real needs of communities.

Involving students in the identification of the ecosystem services, evaluating the benefits provided by urban natural areas, and disseminating the results to people may increase the impact the universities may have at local and regional levels and boost the scientific and civic role of students. Such an approach helps identifying

practical solutions to societal problems and offers students short-term (e.g., multicultural and multidisciplinary environment, skills to apply theoretical knowledge, communication skills) and long-term (e.g., increased interest in civic activities, sense of place, better health status) advantages. In this endeavour, relevant stakeholders, governments, or other nominal parties are universities' partners that play a crucial role. Further research and a review of best practices concerning the students' engagement in different society-relevant fields may be beneficial for overpassing the limited civic engagement of universities in assessing and raising awareness on the role of the green areas for urban communities.

References

[1] Acharya, R. P. & Maraseni, T. (2019). Global trend of forest ecosystem services valuation – An analysis of publications. *Ecosystem Services*, 39(July), https://doi.org/10.1016/j.ecoser.2019.100979.

[2] Argento, D., Einarson, D., Mårtensson, L., Persson, C., Wendin, K. & Westergren, A. (2020). Integrating sustainability in higher education: a Swedish case. *International Journal of Sustainability in Higher Education*, 21(6), pp. 1131-1150, https://doi.org/10.1108/IJSHE-10-2019-0292.

[3] Bellezoni, R. A., Meng, F., He, P. & Seto, K. C. (2021). Understanding and conceptualizing how urban green and blue infrastructure affects the food, water, and energy nexus: A synthesis of the literature. *Journal of Cleaner Production*, 289(January). https://doi.org/10.1016/j.jclepro.2021.125825.

[4] Bendt, P., Barthel, S. & Colding, J. (2013). Civic greening and environmental learning in public-access community gardens in Berlin. *Landscape and Urban Planning*, 109(1), pp. 18-30. https://doi.org/10.1016/j.landurbplan.2012.10.003.

[5] Brown, G., Hausner, V. H., Grodzińska-Jurczak, M., Pietrzyk-Kaszyńska, A., Olszańska, A., Peek, B., Rechciński, M. & Lægreid, E. (2015). Cross-cultural values and management preferences in protected areas of Norway and Poland. *Journal for Nature Conservation*, 28, pp. 89-104. https://doi.org/10.1016/j.jnc.2015.09.006.

[6] Browning, M. H. E. M. & Rigolon, A. (2019). School green space and its impact on academic performance: A systematic literature review. *International Journal of Environmental Research and Public Health*, 16(3). https://doi.org/10.3390/ijerph16030429.

[7] Carpentieri, G., Guida, C., Fevola, O. & Sgambati, S. (2020). *TeMA*. December. https://doi.org/10.6092/1970-9870/7007.

[8] Chambers, D. & Lavery, S. (2017). Introduction to service-learning and inclusive education. *International Perspectives on Inclusive Education*, 12, pp. 3-19. https://doi.org/10.1108/S1479-363620170000012001.

[9] Derr, V. (2018). Urban green spaces as participatory learning laboratories. Proceedings of the Institution of Civil Engineers: *Urban Design and Planning*, 171(1), pp. 25-33, https://doi.org/10.1680/jurdp.17.00009.

[10] Fernández-Esquinas, M. & Pinto, H. (2014). The Role of Universities in Urban Regeneration: Reframing the Analytical Approach. *European Planning Studies*, 22(7), pp. 1462-1483. https://doi.org/10.1080/09654313.2013.791967.

[11] Gavrilidis, A. A., Popa, A. M., Nita, M. R., Onose, D. A. & Badiu, D. L. (2020). Planning the "unknown": Perception of urban green infrastructure concept in Romania. *Urban Forestry and Urban Greening*, 51(March), p. 126649, https://doi.org/10.1016/j.ufug.2020.126649.

[12] Gregory, A. J., Atkins, J. P., Midgley, G. & Hodgson, A. M. (2020). Stakeholder identification and engagement in problem structuring interventions. *European Journal of Operational Research*, 283(1), pp. 321-340. https://doi.org/10.1016/j.ejor.2019.10.044.

[13] Grima, N., Corcoran, W., Hill-James, C., Langton, B., Sommer, H. & Fisher, B. (2020). The importance of urban natural areas and urban ecosystem services during the COVID- 19 pandemic. *Plos One*, 15 (12 December), pp. 1-13, https://doi.org/10.1371/journal.pone.0243344.

[14] Helicke, N. A. (2014). Learning and promoting urban sustainability: environmental service learning in an undergraduate environmental studies curriculum. *Journal of Environmental Studies and Sciences*, 4(4), pp. 294-300. https://doi.org/10.1007/s13412-014-0194-8.

[15] Kovács, E., Kelemen, E., Kalóczkai, Á., Margóczi, K., Pataki, G., Gébert, J., Málovics, G., Balázs, B. & Roboz, Á. (2015). Understanding the links between ecosystem service trade-offs and con fl icts in protected areas. *Ecosystem Services*, 12, pp. 117-127. https://doi.org/10.1016/j.ecoser.2014.09.012.

[16] Maczka, K., Chmielewski, P., Jeran, A., Matczak, P. & van Riper, C. J. (2019). The ecosystem services concept as a tool for public participation in management of Poland's Natura 2000 network. *Ecosystem Services*, 35(January 2018), pp. 173-183, https://doi.org/10.1016/j.ecoser.2018.12.005.

[17] North American Association for Environmental Education. (2017). Community Engagement: Guidelines for Excellence (Issue April). https://cdn.naaee.org/sites/default/files/eepro/resource/files/community_engagement_-_guidelines_for_excellence_0.pdf.

[18] Nugroho, R. A. (2017). Using Service-Learning in Urban Areas in Semarang Regency to Address Local Knowledge System. *Journal of Education and Learning* (EduLearn), 11(3), pp. 332-336. https://doi.org/10.11591/edulearn.v11i3.6379.

[19] Terkenli, T. S., Bell, S., Tošković, O., Dubljević-Tomićević, J., Panagopoulos, T., Straupe, I., Kristianova, K., Straigyte, L., O'Brien, L. & Živojinović, I. (2020). Tourist perceptions and uses of urban green infrastructure: An exploratory cross-cultural investigation. *Urban Forestry and Urban Greening*, 49(February), p. 126624, https://doi.org/10.1016/j.ufug.2020.126624.

[20] Terkenli, Theano S., Bell, S., Živojinović, I., Tomićević-Dubljević, J., Panagopoulos, T., Straupe, I., Toskovic, O., Kristianova, K., Straigyte, L. & O'Brien, L. (2017). Recreational Use of Urban Green Infrastructure: *The Tourist's Perspective*. February, pp. 191-216. https://doi.org/10.1007/978-3-319-50280-9_16..

[21] Tuen Veronica Leung, W., Yee Tiffany Tam, T., Pan, W. C., Wu, C. Da, Candice Lung, S. C. & Spengler, J. D. (2019). How is environmental greenness related to

students' academic performance in English and Mathematics? *Landscape and Urban Planning*, 181(1), pp. 118-124, https://doi.org/10.1016/j.landurbplan.2018.09.021.

[22] Ugolini, F., Massetti, L., Calaza-Martínez, P., Cariñanos, P., Dobbs, C., Ostoic, S. K., Marin, A. M., Pearlmutter, D., Saaroni, H., Šaulienė, I., Simoneti, M., Verlič, A., Vuletić, D. & Sanesi, G. (2020). Effects of the COVID-19 pandemic on the use and perceptions of urban green space: An international exploratory study. *Urban Forestry and Urban Greening*, 56(October), https://doi.org/10.1016/j.ufug.2020.126888.

[23] Vaeztavakoli, A., Lak, A. & Yigitcanlar, T. (2018). Blue and green spaces as therapeutic landscapes: Health effects of urban water canal areas of Isfahan. *Sustainability* (Switzerland), 10(11), https://doi.org/10.3390/su10114010.

[24] Westerink, J., Haase, D., Bauer, A., Ravetz, J., Jarrige, F. & Aalbers, C. B. E. M. (2013). Dealing with Sustainability Trade-Offs of the Compact City in Peri-Urban Planning Across European City Regions. *European Planning Studies,* 21(4), pp. 473-497, https://doi.org/10.1080/09654313.2012.722927.

[25] Wolff, M. & Haase, D. (2019). Mediating sustainability and liveability-turning points of green space supply in European cities. *Frontiers in Environmental Science*, 7(May), https://doi.org/10.3389/fenvs.2019.00061.

[26] Xie, J., Luo, S., Furuya, K. & Sun, D. (2020). Urban parks as green buffers during the COVID-19 pandemic. *Sustainability* (Switzerland), 12(17), pp. 1-17. https://doi.org/10.3390/SU12176751.