

Lecture Notes in Networks and Systems 482

Francesco Calabrò

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# New Metropolitan Perspectives

Post COVID Dynamics: Green and Digital Transition, between Metropolitan and Return to Villages Perspectives

 Springer

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Francesco Calabrò · Lucia Della Spina ·  
María José Piñeira Mantiñán  
Editors

# New Metropolitan Perspectives

Post COVID Dynamics: Green and Digital  
Transition, between Metropolitan and Return  
to Villages Perspectives

 Springer

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# Preface

This volume contains the proceedings for the fifth International “NEW METROPOLITAN PERSPECTIVES. Post COVID Dynamics: Green and Digital Transition, between Metropolitan and Return to Villages’ Perspectives”, scheduled from May 25–27, 2022, in Reggio Calabria, Italy.

The symposium was promoted by LaborEst (Evaluation and Economic Appraisal Lab) of the PAU Department, Mediterranea University of Reggio Calabria, Italy, in partnership with a qualified international network of academic institution and scientific societies.

The fifth edition of “NEW METROPOLITAN PERSPECTIVES”, like the previous ones, aimed to deepen those factors which contribute to increase cities and territories attractiveness, both with theoretical studies and tangible applications.

This fifth edition coincides with what is most likely the end of the COVID pandemic that began in 2020. The global health emergency, despite having been a phenomenon limited in time, has acted as an accelerator of some changes in behavior and in the organization of activities associated with the ever-increasing spread of ICT.

The phenomena are too recent and still ongoing to fully understand the implications they will have on settlement systems, but the conclusion reached at the previous edition of New Metropolitan Perspectives seems to be confirmed: from many of the works presented at the Symposium, a reduction in the relevance of the localization factor emerges with ever greater clarity, at least in the ways known so far from the times of the Industrial Revolution, bringing to light more and more a paradigm shift in the center-periphery dualism.

In fact, the phenomenon that in the past led to the birth of the modern city, the need to concentrate people and activities in small areas, seems to be decreasing: the progressive spread of smart working and the digital modality for the provision of services (just think, e.g., of the digital services of the Public Administration or online commerce) significantly reduces the gaps in terms of accessibility to goods and services between metropolitan cities and marginalized areas, such as inland areas.

But this edition of the symposium also coincides with the start of a new phase for European policies, guided toward the green and digital transition, for the period 2021-27, by the European Green Deal, especially through the tool of the Next Generation EU.

The links between new technologies and sustainability tend to focus on the role played and that can play the city at EU level in fighting climate change.

Many of the contributions collected in this volume address the issue of the green transition through multidisciplinary points of view, dealing with very different issues such as, for example: infrastructures and mobility systems, green buildings and energy communities, ecosystem services and the consumption of soil, providing interesting information on the main trends in progress.

The changes in individual behavior and social organization, associated with the digital transition, are illustrated by the contributions that have addressed the issue of rules and of social innovation practices that are prefiguring new forms of governance for the regeneration of settlement systems. In this context, the issues of the new declinations of the concept of citizenship were also addressed, also with reference to the need to create favorable contexts for individual initiative and entrepreneurship, especially for young people, as a possible response to the challenge of employability for the new generations.

In this context, territorial information systems take on a leading role, together with apps capable of making territories increasingly smart.

The substantial investments planned by the EU to support the green and digital transition in the coming years require multidimensional evaluation systems, capable of supporting decision makers in selecting the interventions most capable of pursuing the objectives. The financial resources used for the implementation of the policies are borrowed from future generations, to whom we will have the obligation to be accountable for our work.

Unfortunately, at the time of writing we must also register serious concerns for the future of humanity, stemming from the risks of the spread of the conflict between Russia and Ukraine. In addition to the obvious concerns about the suffering that was always cause to civilian populations, this situation makes future scenarios even more uncertain: It is clear that the circulation of goods, people and ideas will be increasingly conditioned by future geopolitical balances.

The ethics of research, in the disciplinary sectors that the Symposium crosses, invites us to feed, with scientific rigor, policies and practices that make the territory more resilient and able to react effectively to catastrophic events such as the pandemic or the war: We hope to know the outcomes of these courses in the next editions of the New Metropolitan Perspectives symposium.

For this edition, meanwhile, the more than 300 articles received allowed us to develop 6 macro-topics, about “Post COVID Dynamics: Green and Digital Transition, between Metropolitan and Return to Villages’ Perspectives” as follows:

1. Inner and marginalized areas local development to re-balance territorial inequalities

2. Knowledge and innovation ecosystem for urban regeneration and resilience
3. Metropolitan cities and territorial dynamics. Rules, governance, economy, society
4. Green buildings, post-carbon city and ecosystem services
5. Infrastructures and spatial information systems
6. Cultural heritage: conservation, enhancement and management.

And a Special Section, Rhegion United Nations 2020-2030, chaired by our colleague Stefano Aragona.

We are pleased that the International Symposium NMP, thanks to its interdisciplinary character, stimulated growing interests and approvals from the scientific community, at the national and international levels.

We would like to take this opportunity to thank all who have contributed to the success of the fifth International Symposium “NEW METROPOLITAN PERSPECTIVES. Post COVID Dynamics: Green and Digital Transition, between Metropolitan and Return to Villages’ Perspectives”: authors, keynote speakers, session chairs, referees, the scientific committee and the scientific partners, participants, student volunteers and those ones that with different roles have contributed to the dissemination and the success of the Symposium; a special thank goes to the “Associazione ASTRI”, particularly to Giuseppina Cassalia and Angela Vigliani, together with Immacolata Lorè, for technical and organizational support activities: without them the Symposium couldn’t have place; and, obviously, we would like to thank the academic representatives of the University of Reggio Calabria too: the Rector Prof. Marcello Zimbone, the responsible of internationalization Prof. Francesco Morabito, the chief of PAU Department Prof. Tommaso Manfredi.

Thank you very much for your support.

Last but not least, we would like to thank Springer for the support in the conference proceedings publication.

Francesco Calabrò  
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# Proposal of an Environmental-Economic Accounting System for Urban Renewal Projects

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**Abstract.** The multiple features of the urban systems require actions designed according to integrated logics. In line to current European dispositions on ecological transition and digital innovation, worldwide attention is focused on the programming-planning interventions in view of intergenerational equity. The valorization of existing built-natural environment by eco-systemic services is a strategic asset by European cities (and not ones) to become greening. Nowadays, the System of Environmental-Economic Accounting (SEEA) constitutes the reference framework at international level that integrates economic and environmental data to provide a more comprehensive and multipurpose view of the interrelationships between the economy and the environment in urban contexts. Few applications and logical-operational transpositions of the framework, like the SEEA one, in decision-making systems are found in the literature, especially to support the design of nature-solutions initiatives in urban contexts from the environmental, economic and social points of view.

In this view, the aim of this work is to favor urban interventions analyzed with an integrated logic namely that of ecosystem services. The objective consists in the descriptions of logic-operative framework of multi-criteria matrix for supporting the feasibility of design proposals evaluated in terms of trade-off concerning the environmental-social and economic frame of reference urban context. Expectations on possible operative transcription of the proposed ecosystem workflow assessment for urban projects will be outlined.

**Keywords:** Ecosystem services · Urban renewal projects · Environmental-economic accounting

## 1 Policy Framework

The decisions and policy-making related to the economic growth of the cities and the protection of its biodiversity degree are characterized by multi-level practices that arise from the interaction among multiple actors and processes. This is depicted in the form of the challenge of considering a wide range of interests and value systems in different political scales to legitimate processes that balance and negotiate such interests,

ultimately seeking positive gains in economic valuation. This challenge is particularly important in contexts of urban transformation process [1].

The European Environmental Agency (EEA) published in 2019 *The EU State of the Environment Report 2020* where the biodiversity loss is one of the persistent problems Europe is facing [2]. As indicated by several international reports (e.g., from the Organization for Economic Co-operation and Development (OECD), Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)), land use and cover change are the main threats to achieve positive biodiversity-related alterations [3, 4]. For this, the EU Territorial Agenda 2030 recognizes the need to create healthy environments in territories, and pursues to encourage integrated development and planning to safeguard a sustainable use of the soil and its ecological features [5]. Current realities are asking for a transition in the settlement transformation processes to decrease biodiversity loss, enhance biodiversity valuation while setting trajectories of social, economic and environmental integration towards meeting Sustainable Development Goals (SDG) [6, 7].

IPBES (2019) recognizes the relevancy of encouraging comprehensive environmental assessments, such as Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA), as support instruments to mitigate the impacts of development activities on biodiversity and Ecosystem Services Supply (ESS), and to promote intersectoral approaches in sustainable perspective [4]. Also, the EU Biodiversity Strategy 2030 has a similar recognition, when indicating that to enable transformative change on European biodiversity, it is imperative to commit, implement and enforce (and where necessary review and revise) EU environmental legislation, where both the EU SEA and EIA Directives are included [8]. The Energy & Financial Inclusion (E&FI) can then promote a more equitable redistribution of the benefits and costs related with land-use policies, by financing and policy action enabling territorial equitable biodiversity value sharing [9].

The EU strategy (2021) for financing the transition to a sustainable economy pursues to re-orient investments in four areas: transition finance, inclusiveness, resilience and contribution of the financial system and global ambition. This strategy adds new instruments to the policy options of addressing direct and indirect drivers of biodiversity loss in relation to settlements transformation processes. One of the core in current work will therefore be to evaluate how this strategy can safeguard Biodiversity and contribute to sustainable transformation of the cities [10].

## 2 Literature Review of Methods and Tools. Work Aims

As mentioned above, there are not specific EU laws that regulate the processes of spatial and urban planning, but the fact is that EU influences local development through sectoral policies [11]. Potential negative and positive impacts of these policies on the loss of biodiversity degree because the implementation of settlements transformation processes should ultimately be reduced by integrated evaluation instruments applied in combined manner according to the analysis type (social, economic and environmental) and assessment aim to achieve. In practice, it should be noticed the use of different methods and tools for supporting the integration of biodiversity value in the decision making systems

for spatial and urban planning of the city. Many of them are based on multi-criteria logics for which indicator sets of multiple nature are considered in order to express, in quantitative and qualitative manner, the different impacts on biodiversity within the settlement transformation processes [12–14]. Among the most common known indicators, these could be considered during the evaluation phase of settlement transformation projects in biodiversity perspective: CITY keys indicators for smart city projects and smart cities, Urban Sustainability Index, The Reference Framework for Sustainable Cities (RFSC), The Sustainability Tools for Assessing and Rating Communities (STAR), and Urban Sustainability Indicators.

Evolving towards an integrated practice that protects and enhances biodiversity calls for a change among decision-makers involved in settlements process in urban contexts. The needs to reduce negative impacts of urban policies and processes, and enhance positive impacts, must be recognized.

Starting from these premises, the work aims to provide a methodology for evaluating in eco-systemic terms the effects that the settlements transformation processes can produce in urban contexts and aspired city. This methodology gives the possibility to support some evaluation problems linked to initiatives developed according to eco-systemic logics on the basis of specific performance indicators chosen according to the objective to be pursued, urban ecosystems and social-economic conditions of reference context.

The following Sect. 3 explains: an introduction to the issues to be addressed in Sect. 3.1 related the explanation of the verified framework of the System Environmental-Economic accounting (Sect. 3.2); the evaluation methods and tools for interventions in urban areas that include the conservation of biodiversity according to integrated eco-systemic logics (Sect. 3.3). In Sect. 4 the proposed system of environmental-economic accounting within the economic evaluation of urban projects is illustrated. At last, in Sect. 5 conclusions are reached and the potential for applying the proposed workflow assessment is discussed.

### 3 Material and Method

#### 3.1 Premise

In order to be able to highlight multi-dimensional characters of initiatives by including in an integrated manner the many aspects of settlement transformation project, it is necessary to take into account, in the planning and design phase of the interventions, multiple aspects linked both to the prescriptions contained in the reference regulations in function of the specificity of the intervention to be carried out, and to the characteristics of the state of affairs of the object under examination, and also to the socio-economic conditions of the reference urban context [15].

Thus, preferring a logic of integration between the design aspects related to the same intervention, the following describes a multi-criteria evaluation approach in which to simultaneously include each of them in order to establish the priorities for action in compliance with the current urban system features. This methodology can also provide useful support in carrying out the procedures for accessing the funds allocated to the redevelopment and renovation of the cities. By favoring an integrated evaluation logic,

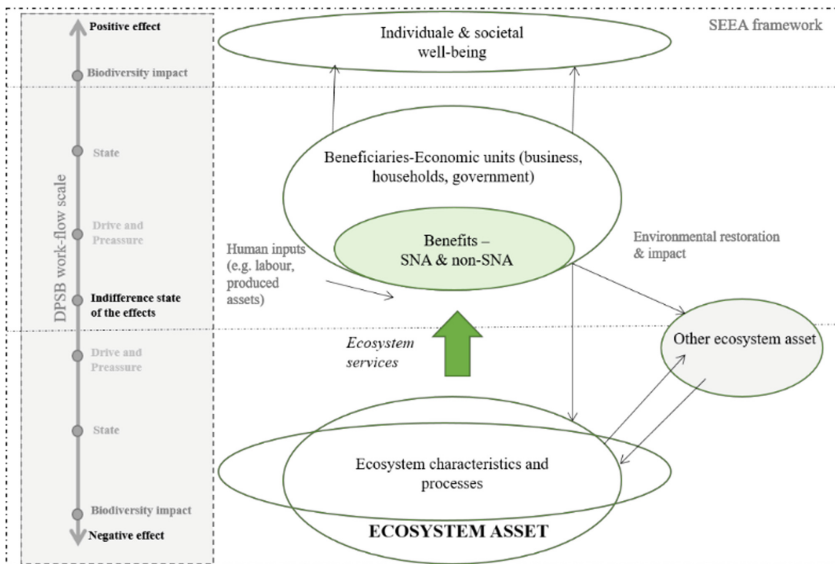
it is possible to establish the type of intervention to be carried out to requalify according to an integrated problem based-solving approach inspired to SEEA.

### 3.2 The System of Environmental and Economic Accounting

The System of National Accounts is a statistical system used at international level. The United Nations has led development of international standards for environmental accounting, the first of which, the System of Environmental Economic Accounting Central Framework (SEEA CF), was officially published in 2012 [16]. The SEEA CF provides accounting standards for natural assets and inputs to economic production. It includes amounts of the stocks of ecosystem assets and the flows of services they bring to the economy and society.

On its basis, the DPSIR (drivers, pressures, state, impacts and response model of intervention) framework was adopted as driver for classifying the type of relations between environmental asset and human settlement. Focusing also on in which manner their links influence the variable production of ecosystem services in terms of Drivers, Pressures, State, impact on the Biodiversity degree of territory (DPSB).

Figure 1 shows linear relations between environmental asset, economic units and societal well-being by the SEEA. The SEEA foot-print is integrated whit DPSB workflow scale for highlighting the correspondence whit the relations between multiple systems (environmental, economic and social well-being) and various impacts degree likely in DPSB.



**Fig. 1.** Proper elaboration by EC (2018), valuation for natural capital and ecosystem accounting: synthesis paper. *Source:* [https://ec.europa.eu/environment/nature/capital\\_accounting/pdf/Valuation\\_for\\_natural\\_capital\\_and\\_ecosystem\\_accounting.pdf](https://ec.europa.eu/environment/nature/capital_accounting/pdf/Valuation_for_natural_capital_and_ecosystem_accounting.pdf) (last accessed 29/11/2021).

### 3.3 Multi-criteria Models and Tools for Supporting the SEEA of Urban Renewal Projects

The different methodologies for the assessment of urban projects in ecosystem key can support the implementation of the mitigation hierarchy process based on the “no-net loss” concept. This is particularly relevant in the assessment of spatial planning projects, policies, plans whose impacts on biodiversity are balanced.

Biophysical methods describe how ecosystems contribute to the supply of ES to society through ecological processes. Examples of biophysical methods include direct measurements (field observations and surveys), indirect measurements (earth observation derivatives, statistical and spatial proxy data), and modelling tools, such as statistical and ecological models [17, 18]. Concerning social impacts, a set of indicators is aimed to be established, which take into consideration, adapt and upgrade the current most known urban social sustainability indicators. Concerning economic impacts, an assessment framework can be set-up that allows for assessing costs and benefits.

To assess the costs and benefits of ecosystems direct and indirect costs and benefits have been identified. Direct costs are for example those related to restoration of ecosystems, e.g., supporting ES such as provisioning of habitat for biodiversity. The inclusion of indirect effects is particularly important for benefits, as these are often secondary. For example, the implementation of ecosystems restoration may lead to a reduction in urban heat island effects, for which an economic effect can be calculated. Another example, restoration of woodland and agricultural areas can lead to biodiversity increases and, at the same time, to higher water quality and reduced carbon emissions. The use of multi-criteria evaluation methodologies makes it possible to take into account environmental, social and cultural aspects either separately or jointly with those of a financial type. This through the use of appropriate evaluation techniques that allow integrated evaluations to be carried out, referring contextually both to the morphological characteristics in which the area subject to intervention falls, and to the effects generated on the territory according to the evaluation question to be achieved [19–21]. A range of valuation methods are compatible with the System of Environmental-Economic Accounting (SEEA) methodological framework for this purpose. E.g., benefit transfer (BT) method is seen as an eligible method in SEEA, even if pilot studies have already employed value transfers (either in physical or monetary terms) in practice. BT should be reconsidered especially at this experimental stage of ecosystem accounting and explicit guidance for its use should be developed. It is a fast and cost-effective method that can enable empirical applications in situations of limited resources [22].

By the literature some of the most popular tools of multi-criteria analysis have been applied [23] to solve evaluation problems related to urban ecosystems, namely: Analytic Hierarchy Processes (AHP) for the selection between different management design options [24–27]; Techniques for Order of Preference by Similarity to Ideal Solution (TOPSIS) [28, 29] and Goal Programming [30] for ranking design alternatives in consideration of ideal solution to pursued; Operations Research optimization algorithms to answer, for example, financial questions for a distribution of available monetary resources among alternative investment projects.



Among the multi-criteria tools, those proposed by Operations Research are particularly useful for the using of logical-mathematical paradigms able to provide an optimal solution to the question posed. In particular, it is possible to solve many evaluation problems by structuring mathematical models of multi-objective optimization based on principles of linear programming, both continuous (PLC) and discrete (PLD).

#### **4 Proposal of a System of Environmental-Economic Accounting Within the Economic Evaluation of Urban Projects**

On the basis of the logical-functional relationships that trace the workflow of the SEEA, as likely in Fig. 2, the structuring of the proposed methodological approach can be synthetically articulated in an interactive integrated process made by the following steps:

- **Step 1:** definition of the specific objectives to be pursued and identification of possible strategies to achieve eco-systemic targets related to the bioclimatic, environmental, settlement, infrastructural, socio/economic conditions of the reference urban context;
- **Step 2:** analysis of the urban context condition, namely the bioclimatic, infrastructural, urban, economic and social features of the area subject to settlement transformation. This in order to collect data for describing the current state of the area and identify strengths, weaknesses, opportunities and risks related to the type of project to upload;
- **Step 3:** quantification, measurement, evaluation of the economic costs and benefits of the intervention; assessment of the impacts by single project produced in terms of ecosystem services supply; using of economic model for supporting decision-making systems by the view of public and private subjects in cases of judgements convenience process.

Specifically, on the basis of the objective of sustainability to be achieved and according to the interests of the stakeholders involved in the single initiative of transformation of the urban area of interest (Step 1), the proposed evaluation framework can guide public-private decision-makers to identify the best project alternative, taking into account the effects generated in terms of eco-system services on the territory. With this framework, it is possible to select and identify the most sustainable project option using a panel of performance indicators that cover multiple aspects of the single initiative, evaluated from an economic, financial, social and environmental point of view (Step 2). The indicators that can be used concern both the conditions representing the urban ecosystem in its naturalistic and biodiversity features, and the performance in terms of impact that the project solution is able to express with respect to the economic, social and environmental characteristics of the intervention area. Moreover, always with the proposed evaluation framework, the selection phase can be supported by the implementation of appropriate methods of analysis and evaluation of project proposals of multi-criteria matrix (Step 3). These methods make it possible to take into account multiple aspects of the project throughout the evaluation process, and to compare several alternatives with respect to one or more sustainability objectives to be achieved jointly.

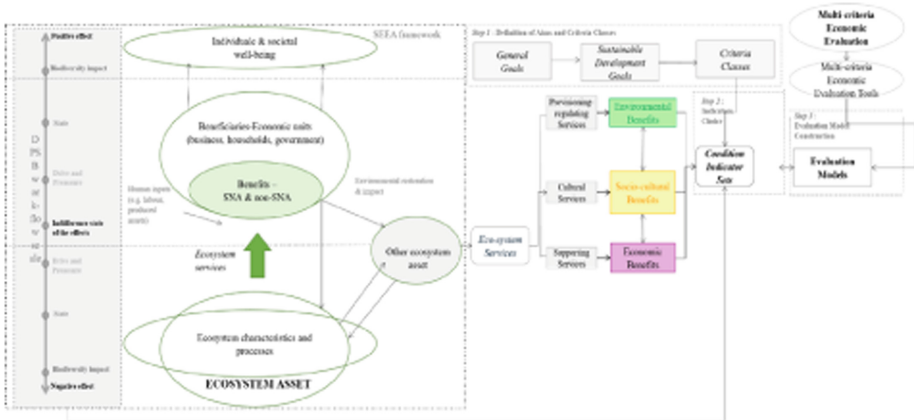


Fig. 2. Evaluation workflow proposed integrating the SEEA and DPSB framework

## 5 Conclusion

A systemic vision between the natural and built environment suggests the use of alternative strategies for a sustainable development of the city. Interventions based on integrated eco-systemic logic lend themselves to promote processes of transformation with a view to urban sustainability, taking into account the multiple effects they generate in the form of Ecosystem Services (ES) that can bring benefits related to the protection of existing biodiversity, economic growth and well-being of citizens. ES is essential to understand the ecosystems bio-value as component of decision-making systems related to the land-use policies. It is a crucial step towards sustainable policy and decision-making, important for both raising stakeholders’ awareness and shaping decisions for both ecological processes and human activities.

In view of the interaction between environmental asset and value system of urban context, as possible to see in SEEA, it is important to use assessment models suitable to take into account the plurality of effects produced by this type of intervention, even in respect of the morphological characteristics of the reference context. The work proposes an evaluation protocol inspired by the SEEA with the aim of developing settlement transformation processes in the perspective of sustainable urban development. The use of evaluation protocols based on multi-criteria analysis offers the opportunity to build different evaluation models depending on the objective to achieve. This is also through the identification of appropriate condition indicators that differ according to the target to be achieved and the type of service. In this sense, the role of this instrument of investigation for the purposes of economic policy is clear, with a view to urban regeneration and environmental enhancement in accordance with integrated eco-systemic logic. Future perspectives will concern the construction of evaluation operative models bringing considerations related to the ecosystem services accounting and their influences on the decision-making processes in sustainable perspective. In this sense it will be deepened the implementation of the Cost-Benefits analysis concerning urban renewal projects where ecosystem services accounting will be computed.

## References

1. Agger, A.: Towards tailor-made participation: how to involve different types of citizens in participatory governance. *Town Plann. Rev.* **83**(1), 29–45 (2012). [www.jstor.org/stable/41349079](http://www.jstor.org/stable/41349079)
2. European Environment Agency (EEA): The European Environment—State and Outlook 2020: Knowledge for Transition to a Sustainable Europe (2019). <https://www.eea.europa.eu/publications/soer-2020>. Accessed 26 Nov 2021
3. OECD: Policy Strategy: Towards Sustainable Land Use: Aligning Bio-diversity, Climate and Food Policies (2020)
4. IPBES: Summary for Policymakers: The global assessment report on Biodiversity and Ecosystem Services (2019)
5. European Commission (EC): Territorial Agenda 2030. A future for all places (2020). [https://ec.europa.eu/regional\\_policy/sources/docgener/brochure/territorial\\_agenda\\_2030\\_en.pdf](https://ec.europa.eu/regional_policy/sources/docgener/brochure/territorial_agenda_2030_en.pdf). Accessed 20 Nov 2021
6. Grima, N., Corcoran, W., Hill-James, C., Langton, B., Sommer, H., Fisher, B.: The importance of urban natural areas and urban ecosystem services during the COVID-19 pandemic. *Plos ONE* (2020). <https://doi.org/10.1371/journal.pone.0243344>
7. Venter, Z.S., Barton, D.N., Gundersen, V., Figari, H., Nowell, M.: Urban nature in a time of crisis: recreational use of green space increases during the COVID-19 outbreak in Oslo, Norway. *Environ. Res. Lett.* **15**(10) (2020). Published 6 October 2020. <https://doi.org/10.1088/1748-9326>
8. EC: EU Biodiversity Strategy for 2030 Bringing nature back into our lives (2020). <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590574123338&uri=CELEX:52020DC0380>. Accessed 29 Nov 2021
9. Klapper, L., El-Zoghbi, M., Hess, J.: Achieving the sustainable development goals. The role of financial inclusion (2016). <http://www.ccgap.org>. Accessed 28 Nov 2021
10. Pettifor, A.: The Case for the Green New Deal. Verso Books, London (2020)
11. Dolores, L., Macchiaroli, M., De Mare, G.: A dynamic model for the financial sustainability of the restoration sponsorship. *Sustainability* **12**(4), 1694 (2020). <https://doi.org/10.3390/su12041694>
12. Spampinato, G., Malerba, A., Calabrò, F., Bernardo, C., Musarella, C.: Cork oak forest spatial valuation toward post carbon city by CO<sub>2</sub> sequestration. In: Bevilacqua, C., Calabrò, F., Della Spina, L. (eds.) NMP 2020. SIST, vol. 178, pp. 1321–1331. Springer, Cham (2021). [https://doi.org/10.1007/978-3-030-48279-4\\_123](https://doi.org/10.1007/978-3-030-48279-4_123)
13. Della Spina, L.: Cultural heritage: a hybrid framework for ranking adaptive reuse strategies. *Buildings* **11**, 132 (2021). <https://doi.org/10.3390/buildings11030132>
14. Del Giudice, V., De Paola, P., Manganelli, B., Forte, F.: The monetary valuation of environmental externalities through the analysis of real estate prices. *Sustain. Build. Environ.* **9**, 229 (2017). <https://doi.org/10.3390/su9020229>
15. Morano, P., Tajani, F., Di Liddo, F., Amoruso, P.: The public role for the effectiveness of the territorial enhancement initiatives: a case study on the redevelopment of a building in disuse in an Italian small town. *Buildings* **11**(3), 87 (2021)
16. United Nations (UN): System of environmental economic accounting 2012—central framework. [https://seea.un.org/sites/seea.un.org/files/seea\\_cf\\_final\\_en.pdf](https://seea.un.org/sites/seea.un.org/files/seea_cf_final_en.pdf). Accessed 26 Nov 2021
17. Mondini, G.: Valutazioni di sostenibilità: dal rapporto Brundtland ai Sustainable Development Goal. *Valori e Valutazioni* (23) (2019)
18. Santos-Martin, F., et al.: Creating an operational database for ecosystems services mapping and assessment methods. *One Ecosyst.* **3**, e26719 (2018)

19. Sheppard, S.R., Meitner, M.: Using multi-criteria analysis and visualisation for sustainable forest management planning with stakeholder groups. *For. Ecol. Manag.* **207**(1–2), 171–187 (2005)
20. Diaz-Balteiro, L., Romero, C.: Making forestry decisions with multiple criteria: a review and an assessment. *For. Ecol. Manag.* **255**(8–9), 3222–3241 (2008)
21. Sica, F., Nesticò, A.: The benefit transfer method for the economic evaluation of urban forests. In: Gervasi, O., et al. (eds.) ICCSA 2021. LNCS, vol. 12954, pp. 39–49. Springer, Cham (2021). [https://doi.org/10.1007/978-3-030-86979-3\\_3](https://doi.org/10.1007/978-3-030-86979-3_3)
22. Guarini, M.R., Morano, P., Sica, F.: Eco-system services and integrated urban planning. a multi-criteria assessment framework for ecosystem urban forestry projects. In: Mondini, G., Oppio, A., Stanghellini, S., Bottero, M., Abastante, F. (eds.) *Values and Functions for Future Cities. GET*, pp. 201–216. Springer, Cham (2020). [https://doi.org/10.1007/978-3-030-23786-8\\_11](https://doi.org/10.1007/978-3-030-23786-8_11)
23. Morano, P., Tajani, F., Anelli, D.: Urban planning decisions: an evaluation support model for natural soil surface saving policies and the enhancement of properties in disuse. *Prop. Manag.* **38**(5), 699–723 (2020)
24. Nesticò, A., Endreny, T., Guarini, M.R., Sica, F., Anelli, D.: Real estate values, tree cover, and per-capita income: an evaluation of the interdependencies in Buffalo City (NY). In: Gervasi, O., et al. (eds.) ICCSA 2020. LNCS, vol. 12251, pp. 913–926. Springer, Cham (2020). [https://doi.org/10.1007/978-3-030-58808-3\\_65](https://doi.org/10.1007/978-3-030-58808-3_65)
25. Calabrò, F., Cassalia, G., Lorè, I.: The economic feasibility for valorization of cultural heritage. The restoration project of the reformed fathers' convent in Francavilla Angitola: the Zibib territorial wine cellar. In: Bevilacqua, C., Calabrò, F., Della Spina, L. (eds.) *NMP 2020. SIST*, vol. 178, pp. 1105–1115. Springer, Cham (2021). [https://doi.org/10.1007/978-3-030-48279-4\\_103](https://doi.org/10.1007/978-3-030-48279-4_103)
26. Del Giudice, V., Massimo, D.E., De Paola, P., Forte, F., Musolino, M., Malerba, A.: Post carbon city and real estate market: testing the dataset of Reggio Calabria market using spline smoothing semiparametric method. In: Calabrò, F., Della Spina, L., Bevilacqua, C. (eds.) *ISHT 2018. SIST*, vol. 100, pp. 206–214. Springer, Cham (2019). [https://doi.org/10.1007/978-3-319-92099-3\\_25](https://doi.org/10.1007/978-3-319-92099-3_25)
27. Vercellis, C.: *Ottimizzazione. Teoria, metodi, applicazioni*, pp. i-470. McGraw-Hill, New York (2008)
28. Manganelli, B., Tajani, F.: Optimised management for the development of extraordinary public properties. *J. Property Investment Finance* **32**(2), 187–201 (2014)
29. Tajani, F., Morano, P., Di Liddo, F.: The optimal combinations of the eligible functions in multiple property assets enhancement. *Land Use Policy* **99**, 105050 (2020)
30. Morano, P., Tajani, F., Guarini, M.R., Sica, F.: A systematic review of the existing literature for the evaluation of sustainable urban projects. *Sustainability* **13**(9), 4782 (2021). <https://doi.org/10.3390/su13094782>

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