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Urban Standards and Ecosystem Services: The Evolution of the Services Planning in Italy from Theory to Practice

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Received: 4 February 2020; Accepted: 12 March 2020; Published: 20 March 2020

Abstract: Human well-being is determined by multiple factors related to health, social relations, safety, environment, landscape, cultural heritage, and quality of services. The Italian planning system provided a set of "urban standards", in terms of threshold values of areas per inhabitant destined for public services and facilities. The application of urban standards, for a period of more than fifty years, did not result in a broad improvement of life quality in the urban areas. This paper discusses the issue of urban facilities in Italy in order to evaluate the opportunity to innovate traditional standards according to the environmental and ecological paradigm, focusing on the benefits provided to humans by natural ecosystems, the so-called ecosystem services (ESs). The paper investigates the evolution of the Italian planning practice through the introduction of quality standards and innovative tools able to meet the ever-changing social demand. The research aims to verify if the ES concept is really implemented in the Italian planning practice and if the ecosystem approach has a real impact on political decision-making. Using a comparative method, four case-studies of urban municipal plans are selected and analyzed in order to identify different approaches and possible fields of innovation. The research highlighted a lack of integration of ecosystem services approach in the land use decisions, although there is an in-depth survey on the state of conservation of ecological and environmental resources. The local experiments of qualitative standards represent an attempt to deal with specific ecological emergencies, namely flood risk, air, water, and soil pollution, and loss of biodiversity. Conclusions discuss, from an international perspective, the need to revise the traditional planning approach in the field of public services and facilities, taking into account the influence of ecosystem services on human well-being.

Keywords: urban standards; ecosystem services; urban facilities

1. Introduction

The system of common goods, services and infrastructures strongly affects the quality of life for communities living in urban areas. The social aspirations associated with urban life must be addressed inasmuch as they overcome the individual needs expressed by the consumer society and meet the higher "right to the city" [1]. The city should always enable the free expression of collective and individual needs for complementary or contrasting activities, including gathering and socializing places, creativity and cultural events locations, job opportunities, sports and entertainment facilities where the communities can enjoy tangible and intangible services. The aim to achieve a fair and sustainable human well-being must lead the regeneration processes of the existing urban fabrics, without new developments on natural land [2]. The current challenge for urban planning is to integrate the environmental paradigm into the issue of collective services, according to the principles of social equity and environmental justice [3]. The application of this

assumption allows the supply of public services, transportation, recreational and cultural spaces to be expanded, while ensuring greater flexibility on the adaptation to the ever-changing social needs [4]. The city is indeed the place where the quality of life, the economic productivity, the safety and health of the population and the environment are deeply intertwined and sometimes underestimated [4,5].

In Italy, the traditional planning approach is based on a rational and regulative definition of strict land use zoning and parameters. Since 1968, the provision of public services and facilities is regulated by "urban standards", intended as the minimum provision of public space for each inhabitant (present or future) or new function. Several studies highlighted the need to move from the traditional approach, typically based on "a priori" quantitative definition of types and minimal areas for common services and infrastructures, to a more innovative solution ensuring an adequate qualitative level of public services and contextually guarantee the preservation and accessibility of the environmental system [4,6–8].

Accordingly, the definition of criteria that take into account the benefits provided to humans by natural ecosystems [9–11] can increase the effectiveness of the traditional urban-environmental parameters, based exclusively on quantitative principles for the spatial identification of areas intended for public services, neglecting to consider the effective contribution in terms of well-being of the inhabitants.

This statement is linked to the concept of ecosystem services (ESs) [12,13], together with the so-called "ecological print", connected to the human consumption of natural resources in relation to the Earth's ability to reproduce them [14]. The potentialities offered by ESs clarified exhaustively the relation between human welfare and ecosystem functionality [13,15] and the relevant contribution toward a sustainable and resilient urban development [15–18].

The paper analyzes a few recent experiences of Italian cities' land use plans to uncover several innovative elements to apply to the urban standards and, in particular, new models of ecological/environmental and quality standards. In Italy, the state of integration of ESs in spatial and land use planning and its effective impact on political decision-making have been investigated.

While the scientific research focuses on the methods for mapping of ESs and their specific performance, the planning practice shows the difficulty to integrate them into a comprehensive evaluation of the demand and supply of public services into the decisional processes for the governance of the territory [4].

According to the scientific literature, urban plans should take into account the benefits derived from appropriate management of the ecosystems, in order to reach satisfactory levels of well-being but also to provide the maintenance and protection of ESs [13,15,18–21]. The study of a model for the analysis of urban ESs is a research field that grew considerably in the last two decades, although the techniques used to implement the services and the choices underlying the planning are still immature [22–25]. Some planning theories and ideas, such as the "garden city" and the "intelligence growth", have a similar conceptual foundation [4,26], which integrate the concept of green infrastructure as a systematic method to contain the expansion of the urban fabric, ensuring a coherent relationship between the natural and the built environment. Due to the lack of attention to the protection of ecosystems and biodiversity, the Italian urban and regional planning often targets just the protection of the environmental values, regarded as natural, identity, or cultural elements [3]. Given that changes in land use play a central role in the delivery of ESs and urban planning, in turn, has a significant influence on their conservation or enhancement [21,27,28], the paper has adopted a comparative case study approach to evaluate the current state of integration of the concept of ES in land use plans and the opportunity to consider the ESs in a broad sense, as common goods that influence the communities' quality of life.

2. From the Quantitative Model to the Qualitative and Ecological Standards

In the second half of the 1950s, in order to improve the quality of general urban plans, the Italian government realized the necessity to define standards and parameters on the supply of public services and facilities, applicable to often extremely different contexts [7,8]. The issue of service

supply assessment, influencing the relationship between public and private spaces, has also been managed by public bodies involved in the field of social housing, such as the "INA Casa" (abbreviation for the Italian housing program financed by INA (National Insurance Agency). The debate on the urban standards led to the draft of a national law (L. n. 765/1967, known as "Legge Ponte") [30]. It took place in a historical context that dedicated great attention to the quick expansion of Italian cities, planned with simplistic and inadequate tools [29].The concept of "urban planning standard", was definitively introduced with Inter-ministerial Decree 1444/1968. Over the decades, each region contributed to a better definition of the national urban standards by promulgating reforms that adjusted the quantitative thresholds. This provision is mandatory, regardless of the local management choices and the spending capacity of the institution in charge [31]. As described in Table 1, the urban standards differ, in terms of quantity and type, according to the zoning [32].

Table 1. Urban standards defined by Inter-ministerial Decree 1444/1968.

Zoning	Criteria	Parameters
Residential areas	18 square meters of urban standards per capita (100 cubic meters per capita of building provisions)	education areas—4.5 sq. m/inh.
		common facilities and services—2 sq. m/inh.
		public spaces such as parks, playgrounds, sports fields—9 sq. m/inh.
		public parking lots—2.5 sq. m/inh.
Industrial areas	Percentage of the total area	10% of the area for the industrial settlements
Commercial or offices areas	Parameter referred to the gross floor area of expected buildings	80 sq. meters of public facilities per each 100 sq. meters of the gross floor area of the expected buildings. 50% of them destined to parking lots

The determination of a standard value can be considered as a compromise between economic forces—involved in the transformation of the territory—and political forces, safeguarding collective interests. This value guaranteed basic satisfactory requirements that were capable of meeting the social needs and were consistent with the interests negotiated by a specific class [6,32]. Therefore, the national criteria were clearly applicable only in a certain historical period characterized by a remarkable expansion of urban areas, no longer acceptable considering the changed conditions of the economic and cultural context [4]. Many studies have focused on developing indicators to evaluate factors that directly affect human well-being, also assessing adequate levels of quality of life in terms of services, facilities, and infrastructures [33–35]. For example, the World Health Organization recommended to guarantee a minimum threshold of green spaces (nine square meters pro capita) but considered an ideal amount of 50 square meters of urban green spaces for each inhabitant [33,36].

Today, cities show a shortage of services and infrastructures due to the scant commitment of the administrators, the insufficient public funds, the high expropriation cost to acquire areas, the tendency to ensure the mere availability of public surfaces, with no concern for the performance of services provided to the community [4,37]. The costs relating to the expropriation allowance, the realization of the service and its management cannot be sustained by the local authorities. This results in the unfair treatment of private property, subjected to indefinitely reiterated constraints, without compensation. After the sentence n.348/2007 of the National Constitutional Court, that required to pay market price for the areas for public facilities instead of the agricultural value, the expropriation became increasingly unused [37,38].

The plans often remained unapplied in the provision of public services and facilities, leading to inadequate and variable implementation of the urban standards [39]. For example, the survey 2018 of the Italian National Institute of Statistics (ISTAT) showed encouraging data about the available urban green spaces in Italy, with an average of 32.8 square meters per inhabitant [40]. However, in the main provincial towns, the data reflect a remarkable heterogeneity, namely the provision of urban

green spaces per capita is notably different from town to town, from the low value of Crotone (3.6 sq. m./inh.) to the wider green areas of Matera (997.2 sq. m./inh). Since the first applications, urban standards have shown excessive rigidity, which overlooks the social structural changes, the heterogeneity and complexity of the geographical context, the availability of the resources and the different strategies enacted by the political choices [8]. For example, the traditional criteria overlook that the volume per capita is generally higher in low-density urban areas than in central areas [41], the demand for educational services is connected to the expected increase in the school-age population [42,43], the need for religious buildings is not limited to Catholic churches [44,45] and the provision of parking lots is linked with urban mobility system and hubs. For these reasons, a review of the criteria, used for the analysis of needs and supply, is clearly required in order to consider the settlement conditions and the demographic and social trends, monitoring the actual necessities expressed by the stable population and by the daily or seasonal flows of non-resident users [31,39,46].

In a general view of urban regeneration, the concept of "urban standard" is replaced by "territorial provision", which includes the services requested by individuals, families, and companies, regardless of the providers, either public or private and mixed [47]. Moreover, the reuse of existing buildings and areas can contribute to achieving the dual purpose of renovating the urban fabric and improving the local system of services and facilities [31].

The quality of the service system is particularly important in the disadvantaged territories, namely in the so-called inner areas, that cannot enjoy essential services. In this context, due to the high costs/benefits ratio for the realization of new public facilities, the provision of services may take place at regional/provincial (supra-municipal) level, guided by quality and efficiency criteria to limit the public expenditure and maximize the benefits for the local communities [48]. Unfortunately, this goal clashes with poor integration between regional policies and local planning [39,49].

If urban standards can easily control the amount of service provisions, the quality criteria are difficult to translate into standard values referred to more debatable aspects, depending on the specific physical, temporal, and economic features of the context, such as functionality, accessibility, spatial distribution, sphere of influence, usability, and efficiency [39,50]. For example, the accessibility to urban green spaces can positively affect public health and the opportunities for physical and social activities, acting as a qualifying factor for the city and a driver of the real estate demand [51,52]. An unfair and irregular distribution of green areas in the urban areas mirrors the characteristics and conditions of the inhabitants (i.e., income, social level, age, and gender) and can be an indicator of racial, ethnic and socio-economic disparities [53,54].

The reform of the regional planning laws reflected the debate on the qualitative/quantitative dimension of the standard. The Italian regions of Lombardy and Basilicata focused on the qualitative aspects of the standards which they put under the control of the municipal plans, while other regions, such as Emilia Romagna, Veneto, Calabria, Valle d'Aosta, and Lazio, focused on both the quantitative and the qualitative requirements. Few regions, for example Umbria and Lombardy, chose a specific programmatic plan to address the management of the collective services, known as "Plan of Services" [55]. The remaining regions have confirmed the national model, sometimes expanding the thresholds and requirements, without questioning the underlying logic [31].

The Basilicata Region required an assessment of the system of services and infrastructures, including a quantitative and qualitative analysis of the territorial distribution, the state of use, the management costs and the performance (in terms of accessibility, suitability for different age groups, functionality, and technological adequacy).

A recent law proposal of the Piedmont Region takes into account, in addition to the national urban standards, the provision of additional surfaces for environmental, ecological, and ecosystem services (Law Proposal Piedmont Region n. 302, June 2018).

The adaptation of the service supply is achieved through the creation of new quality standards aiming at the safeguard of the spatial structures that guarantee functions and advantages provided by the ESs, improving the quality of life of the communities and the territory resilience, according to both natural science and socio-economic studies [56–58]. Cities and urbanizing regions take

advantage from the ESs produced in the urban areas, but also are at the center of material and energy flows and natural goods availability that expands on much larger areas [59,60].

Although urban citizens are dependent on global ecosystems, the locally generated ESs have a particularly high value due to the great number of beneficiaries. In this direction, the research had sometimes focused on the evaluation of the consequences of changes in ecosystems on human well-being, in terms of social-economic costs, in order to support decision-makers in the definition of ESs conservation and enhancement actions [61–65].

Over the years, many authors proposed a variety of ESs classifications that the environmental analysis can suggest [12,66–69]. However, every system of classification is based on an unrealistic simplification, because "ecosystems are complex, dynamic, and adaptive systems with non-linear feedbacks, thresholds, hysteresis effects" [69] (p. 351).

The most popular is the Millennium Ecosystem Assessment (MEA), which divides the ESs into four categories: Supporting services, provisioning services, regulating services, and cultural services [12]. Nowadays, it has been overcome by more effective theoretical systems that clarified the distinction between ends and means [70].

Services exist if a specific benefit or beneficiary can be identified. It is something that people can enjoy, and it must be considered only in relation to people's needs [67,68]. According to Costanza, ESs are means to human well-being and it is difficult to categorize and distinguish processes, benefits, and services (intermediate and/or final) [68,69,71]. This is the assumption of the Cascade framework, proposed by Haines-Young and Potschin, that analyzed the connection between ecological structures, processes generated by ecosystems, services and benefits gained by society, following a pattern similar to a production chain [66,67,72].

A more recent classification, the Common International Classification of Ecosystem Services (CICES), has been developed by the European Environment Agency (EEA) with the support of other institutions [66]. It represents a revision of the MEA classification, based on the recognition of the need to standardize the criteria of ESs analysis and description. Figure 1 represents the conceptual background for CICES, using the Cascade model with the distinction between benefits and values.

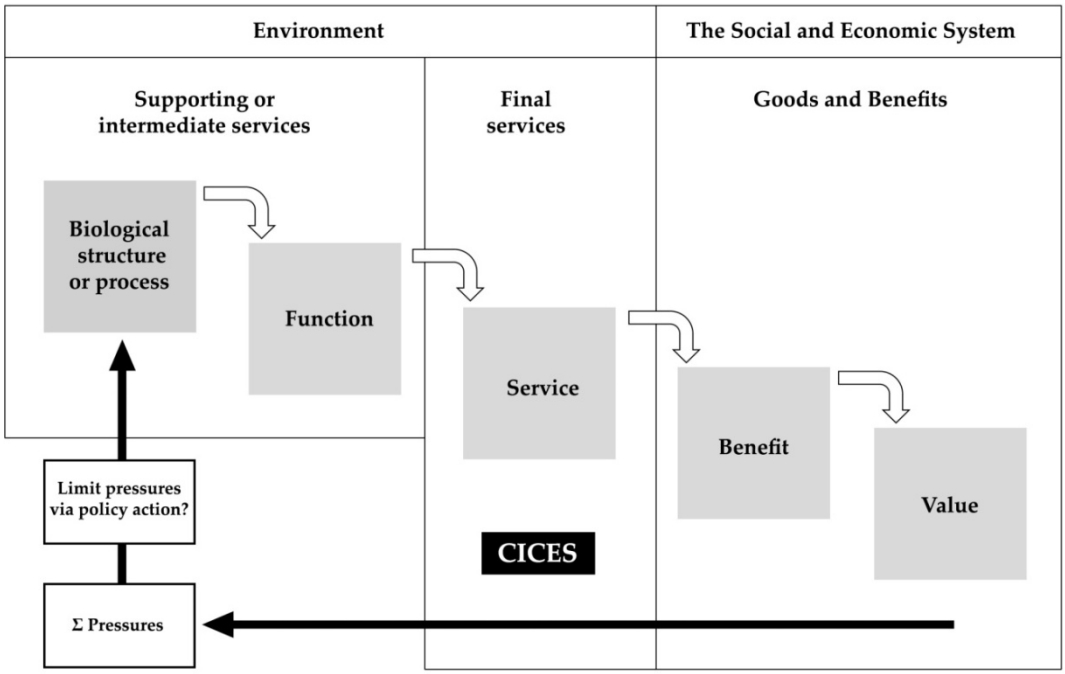

Figure 1. The ecosystem service cascade model. Processed by the authors based on Haines-Yong, R., Potschin, M. CICES Version 5.1, 2018, available at: www.cices.eu [66].

The CICES excluded the so-called supporting services and focused only on the provisioning, regulating, and cultural ones. The reason is related to the difficulty of identifying and describing the

final outputs of supporting services, also known as intermediate services, from ecosystems that people use and value [66,67].

The classification proposed by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Service program (IPBES) recognized that many services fit in more than one of the MEA categories. In the last proposal, dated May 2019, ecosystem goods and services are defined "Nature's contributions to people (NCP)", including all the contributions of nature, both positive and negative, to the quality of life of humans as individuals, societies, or humanity as a whole [73]. In the IPBES conceptual framework, ESs are delivered by a category of nature, biodiversity, and ecosystems and contribute to a good quality of life, thus separating out means and ends.

The paper aims to verify if the ES concept is really implemented in the Italian planning practice and if the ecosystem approach has a real impact on political decision-making. The state of integration of ESs in spatial and land use planning in the Italian context has been investigated to understand whether or not there is a lack of consideration of ESs approach in the land use decisions.

3. Materials and Methods

The methodology is based on a comparative case study approach, considered an effective strategy in the research field of urban and regional studies [75,76]. It is defined to understand the path of different regional contexts and the points of convergence or divergence across these [77].

The framework of the qualitative and comparative analysis, summarized in Table 2, has been applied to the review of a few recent examples of Italian land use plans, focusing on the integration of ES concept into a more comprehensive system of services and infrastructures able to achieve a higher level of life quality.

The first section of the comparative framework focuses on the analytical part of the plans concerning the ES knowledge. In particular, the paper examines in depth the recognition and classification of the spatial components that are part or can become part of municipal ESs networks, understood as the system of components that make up the environmental structure of a limited urban fabric. According to the points identified in the cascade model, the paper investigates the description of the environmental, cultural, and ecological structures and their attributes (biophysical structure and processes). The other points concern the evaluation of ecosystem functions, services, and their influence on human well-being, in terms of benefits and values for the community. The second part of the analysis concerns the investigation of strategies and actions to improve human wellbeing through the conservation, rehabilitation, or enhancement of ecosystem service in urban areas [77].

Table 2. Analysis **f**ramework. Processed by the authors based on literature review [24,66–77].

ANALYSIS	Biophysical structure and processes	Identification of the spatial components of existing or potential ecological networks. Analysis of the structure, the processes, and the biophysical function of ecosystems.
	Functions	Description of ecosystem properties or urban areas' potentialities in terms of ecosystem functions.
	Services	Identification of the final services and products provided to the community by ecosystems.
	Benefits and values	Data on the influence of ecosystems on human well-being in terms of benefits and values provided.
STRATEGIES AND ACTIONS	Conservation	Strategies and actions aimed at preserving the health and the functionality of ecosystems.
	Regeneration	Strategies and actions aimed at restoring the health and the functionality of ecosystems.
	Enhancement	Strategies or actions aimed at enhancing the existing provision of ecosystem services or creating new ecosystems.

The focal points of the investigation are four case studies of urban municipal plans adopted by Bologna, Rome, Milan, and Florence (Figure 2), that are the capital cities of Italian regions characterized by different sets of rules in terms of regional planning tools and environmental policies. The selection is based on the criterion of achieving a wider range of approaches used to deal with the issue of environmental, ecological standards and ESs: Bologna and Rome, as they represent interesting examples of municipal ecological networks that are still not connected to ESs; Milan, because it is experimenting with an innovative model of sectorial public services planning that includes the ecological network; Florence, that has attempted the integration of the ESs in the management of the soil usage, with an emphasis on building an ecological network that becomes the driver of city transformation. It allowed us to uncover several innovative elements to apply to the urban planning standards and, in particular, new models of ecological/environmental and quality standards.

Figure 2. Map of case studies (Processed by the authors based on ISTAT open data 2019).

The main documents of general urban plans of each case study have been collected into the official websites of the municipalities (the latest updated version available at December 2019). Appendix A provides a full list of the documents used in the comparative case studies analysis, in particular:

- the plan reports, both general or specialized (e.g., the description of the methods and strategies adopted in the planning instrument);
- the regulative sections (e.g., the system of rules to manage urban development, the measures to preserve ecological functions);
- the figures and tables (e.g., the identification of services and green infrastructures, the evaluation of ecological potentialities, the description of the environmental system).

In the discussion section, an assessment of the degree of knowledge and consideration of each point of the analysis framework was provided in order to allow the comparison of the case studies. If the plan contains data, descriptions, or adopts criteria relating to a specific point of the analysis framework, the level of detail is assessed (inadequate, moderate, or good).

4. Results

4.1. Bologna

Bologna ranks at the top of the list of Italian cities for its vast heritage of gardens and urban parks, which covers an area of over 350 hectares. In the last decades, the policies of environmental protection have contributed to the conservation of the natural, historical, and rural landscape, which corresponds to almost half of the municipal administrative area. However, it does not automatically guarantee a sufficient supply of ESs to control the anthropic pressure on the environmental resources.

With the aim of improving the overall quality of the urban environment, the 2008 Structural Municipal Plan (PSC) focuses on the strengthening of the ecological network and preserving and recovering the natural habitat. The municipal ecological network is organized into three hierarchical levels (main, secondary, and urban level) constituted by a polyvalent system of "knots", which are eco-systemic elements acting as reservoirs of the local biodiversity of fauna and flora.

The main ecological network consists of a series of complex ecological hubs and passageways that connect the different parts of the city with the protected wide areas of the provincial territory. Sometimes it also includes agricultural areas, such as vegetable gardens, sports areas with or without the relative public services, and facilities that do not compromise its ecological value.

The secondary ecological network is defined by simple hubs, local ecological passageways, and spread-out areas that guarantee the connections among the parts of the city. The PSC enlists the linear elements, both natural and semi-natural (box hedges and tree lines, arboreal strips, waterways, reclamation drains, linear lawns, salvaged green scarps, etc.) that either show an ecological value or can acquire it through recovery actions. The local ecological passageways are nature vehicles leading, through connective areas, to the urban ecological hubs that are city sectors with a relevant ecological value, often only potential, containing at the same time rural and urban public green elements. Usually destined to playful recreational areas and pedestrians and bikers, they represent, with the urban ecological connective green, a set of open spaces that have actual or potential ecological value, often allocated for public use. The urban ecological connective green is represented by a set of private and public gardens and parks, boulevards and decorative greenery, vegetation, and natural soils. Spread all over the city, it constitutes an ecological reservoir of permeable soil that helps to reduce air pollution.

In addition to the guidelines for safeguarding and strengthening the ecological network, the plan includes further measures aimed at mitigating the impacts produced by mobility infrastructures on the natural environment. In the development of new settlements, environmental compensation measures are provided in order to increase the vegetation cover in green areas and the permeable soil(at least 75% of the total area).

The plan adopts market-based tools, such as non-financial compensation, to freely acquire more than 200 hectares of natural land by transferring the development rights to other suitable areas.

Table 3. Results of the analysis. The case of the Urban General Plan of Bologna.

ANALYSIS	
Biophysical structure and processes	Identification of three ecological networks based on the specific environmental and landscape value or the ecological potentiality: Main ecological network(complex ecological knots and corridors); Secondary ecological network(simple ecological knots, local ecological corridors, ecological and landscape connective tissue); Ecological urban network (urban ecological knots, local ecological tissue)
Functions	Connection between urban and external areas, preservation of environmental system and protected areas, soil permeability.
Services	Food production, periurban agriculture, environmental and natural goods production, reduction of air and electromagnetic pollution, climate regulation, preservation of existing and potential biodiversity, mitigation of the infrastructure's impact on the landscape and environment.
Benefits and values	Not considered.
STRATEGIES AND ACTIONS	

Conservation	Identification of new ecosystems and river areas to protect.
Regeneration	Revitalization and naturalization of compromised public properties, in order to create new ecosystem services at a regional scale (i.e., planting intervention).
Enhancement	Valorization of the agricultural land near the urban area, through the creation of new public green areas and the promotion of collective use of agricultural lots. Increase in the permeable surfaces. Valorization and improvement of existing tree areas to realize a new important biological and ecological reserve, connected to rural and river areas, with a public recreational function. Realization of a green lung to mitigate the impact of road and train infrastructures to became tree-lined roads. Realization of an important river park of supra-municipal level through the creation of path along the river, the naturalization of large brownfields and the recovery of degraded areas.

4.2. Rome

The 2008 General City Plan of Rome (PRG) paid specific attention to the ecological and environmental issues, although the city registered record values for the increase of newly built areas in the last years [78]. The cartographic documents identified the green and ecological network that includes primary, secondary, and new additional components. The primary elements are the important natural ecosystem components, such as environmental protected areas, agricultural parks, and areas of naturalistic relevance. The secondary elements connect other areas of the hydrographic and agricultural network and some parts of the residential zones, also including services and infrastructures. The primary elements usually concern areas subjected to measures of environmental protection, whereas the secondary components are intended to recovery and restoration actions, in particular on rundown areas.

The plan introduces some restrictions on the use of green areas included in the ecological network and in the local public services system. In particular, it mandates a public destination for park or sport areas and a compulsory requirement of a permeable surface larger than 80% of the total area. To strengthen the ecological network, in the "Renovating City" zone, new building constructions in the free areas are forbidden, while the development rights can be transferred to other suitable locations [79]. The executive planning allocates the areas included in the ecological network either to the public green, in order to satisfy the urban standard requirements, or to the private green, supporting the ecological strategies. The plan increases the number of urban standards defined by national law, up to 22 square meters for each inhabitant.

Moreover, it established incentives for the demolition of the incompatible buildings included in the ecological network, encouraging the transfer of the development rights and the conversion into a green area [39]. The municipal authority has the possibility to adopt integrated plans to coordinate and promote safeguard measures and interventions, recovery and enhancement of the ecological network through the increase of spontaneous greenery, maintenance of the watercourses, reconversion of parts of the hydrographic network, promotion of the archeological, historic and monumental heritage, preservation of the panoramic vantage points and belvederes, protection of the landscape integrity and continuity, limitation of the soil sealing, and reduction of the environmental pollution. The private and equipped green areas are subjected to specific rules aimed to guarantee a minimum amount of vegetation (40 trees and 80 shrubs/hectare) or to provide sports facilities and relative services.

Table 4. Results of the analysis. The case of the Urban General Plan of Rome.

ANALYSIS	
Biophysical structure and processes	Identification of ecological networks(structured on three levels of components), natural protected areas, hydrographic network, agricultural areas and parks, green belts.
Functions	Ecological and hydrological functions provided to the urban area thanks to the connection to the natural areas and the ecological network. Agricultural parks as a land supply for the economic activities.
Services	Biological agricultural production.
Benefits and values	Not considered.
STRATEGIES AND ACTIONS	
Conservation	Preservation of agricultural soils (agricultural parks). Strategies and actions of safeguard for the municipal ecological network. Monitoring and periodic evaluation of the municipal ecological network conservation in terms of naturality and functionality.
Regeneration	Rehabilitation and naturalization of the hydrographic network, through the creation of agricultural parks. Restoration and environmental requalification of compromised or degraded areas.
Enhancement	Realization of new green belts and natural components to integrate the ecological network.

4.3. Milan

Collective services and infrastructures represent an important field of innovation in the planning system of the Lombardy Region. The introduction of a new municipal sectorial instrument, the Plan of Services (PS), aimed at the identification and implementation of an adequate qualitative and quantitative provision of public services (Lombardy Regional Law n.1 of 2001). According to the other plans or programs in force, this instrument establishes the desired quality level and the methods to be used to implement and manage the service system by encouraging forms of public and private partnerships to share economic resources, functions, and goals [55,83].

The PS has to take into account the environmental function of the green areas, the organization of parking lots in a broad approach to the management of the mobility system, and the coordination with the other municipal plans.

A few years later, the Region of Lombardy strengthened the role of the PS, which is entrusted with the task of "[...] ensuring a global provision of areas for public facilities of general interest, of any area intended for public residential housing, vegetation, ecological passageways, and green areas connecting the rural with the urban territory"(art.9, Lombardy Regional Law n.12/2005). Moreover, the law promotes the realization of green connections between infrastructures and urbanized areas and their rational distribution within the municipal territory, to support the current use and the possible future applications. A detailed program, concerning the assessment of costs, timing, priorities, and methods to realize the services, has been established by the law but often overlooked in the plan drafting.

The Milan municipality has drawn up a Plan of Services (March 2019), as it is stated in the Regional Law, concerning the identification and the regulation of the existing and future services, such as urban green, mobility infrastructures, public transportation, and social housing.

It analyzes in detail the ecological network and makes reference to the ESs as part of the collective services and infrastructure system, for example, the regulation services and the mitigation services to tackle climate change, promote and strengthen biodiversity, decontaminate waterways, and enhance the circular economy. The system of the green spaces strongly favors the improvement of the urban quality as it encompasses ecological, environmental, and social needs.

The identification, in the cartographic documents, of the existing and new elements that characterize the green network, should take into account the numerous types of public green spaces, harmonically merge with the private areas destined to agricultural activities. For example, the category of the "environmental green" also includes areas for the mitigation and decontamination of roads and infrastructures, not directly enjoyed by the inhabitants but nonetheless essential for the maintenance of the land permeability, the control of thermoregulation and other ESs. Finally, an innovative point lies in the so-called Local Identity Nuclei (NIL), namely city sections or neighborhoods that share common identity features. Each NIL has to be equipped with a local park or a system of common gardens and directly connected with the municipal green network.

The achievement of predefined levels of ESs production is encouraged by a ten percent reduction of the urban standards requirements. Moreover, the interventions of afforestation on private areas and of waterways regeneration are considered as a part of the amount of the urban standards.

Table 5. Results of the analysis. The case of the Urban General Plan of Milan.

ANALYSIS	
Biophysical structure and processes	Identification of the green areas, subdivided into: Existing urban green areas, environmental green areas, new urban green areas, and planting areas. These components constitute the municipal ecological network, where the equipment of ecosystem services is considered as an environmental infrastructure. Identification of historical urban fabrics and of the existing or new religious buildings, recognized as services for the local communities.
Functions	Mitigation and naturalization of the areas affected by the infrastructural network. Recognition of religious buildings to support the cohabitation between different communities and to improve integration processes. Identification of the historic urban fabrics in order to preserve the local identities.
Services	The environmental green areas guarantee the permeability of the soil, the reduction of climate pollution and greenhouse gas, and the improvement of ecosystem services, contributing to the connection of the ecological network.
Benefits and values	Not considered.
STRATEGIES AND ACTIONS	
Conservation	Protection of agricultural uses in order to safeguard the environment. Protection of traditional cultures and knowledge through the improvement of public areas of the historic urban fabrics.
Regeneration	Revitalization of watercourses and of the brown fields, in order to reduce the amount of low-quality soils.
Enhancement	Improvement of the amount of natural soils. Identification of areas in which to provide the afforestation. Promotion and strengthening biodiversity. Guarantee a high percentage of natural soils in case of new intervention.

4.4. Florence

The Structural Plan (PS) and the Urban Regulation (RU) of Florence are very interesting examples of planning instruments that focus on the ecological network in order to preserve the ecosystemic value of the territory. After the plan was adopted, in 2010, the many revisions that took place did not question the general strategy of land-take reduction based on initiatives of urban regeneration. The project proposals consisted of building replacement and restoring techniques that

allow the improvement of the urban and environmental quality and the enhancement of collective services and infrastructures.

The plan provided a dynamic network of public spaces and services that can be adapted to the new social needs. The enhancement of the infrastructural and service supply is supported by private agreements to gives up freely 50% of the development areas to make parks and other public spaces.

The plan redefines the ecological network by including ecological corridors, ecological knots and other parts of the ecological network within the city. The large green infrastructure connects linear elements (corridors) and areas (knots) that act as "biodiversity reservoirs" for which actions for the conservation of the fauna and flora biodiversity are provided. The ecological knots are differentiated into new or pre-existing knots, that may or may not need requalification. The elements of the urban ecological network (parks and urban gardens, green areas, tree lines) are often quantitatively adequate but not accessible, making it necessary to create new connections. The enhancement of the environmental quality is achieved through the improvement of the ecological functions of the existing green areas, through interventions of urban renewal and development of the ecological network with the support of public or private investments.

Urban green spaces are classified according to the following categories: The green garden, including all urban or peri-urban green spaces, both public or private, the green parks, including large areas, often next to historical buildings, the tree-lined boulevards, namely the continuous linear rows of trees placed along the main city roads.

In the analysis of the municipal green areas, the whole surface has been divided into pre-sized cells that were subsequently classified depending on their type, size, quality, accessibility, and spatial relation with the anthropic background. The density, the characteristics, the composition, and the spatial distribution of the vegetation represent useful factors to identify the areas fit for purposes of biodiversity conservation, climate control, air purification, and micro-habitat support.

The ecological network has been designed to connect the urban area to the peripheral zones, allowing the transit and migration of the fauna. It is involved in a wide set of plan actions, such as the management of existing trees and vegetation (amelioration, completion, and/or substitution of specific plant essences) or the enhancement of areas already characterized by ecological potentialities. The project of the ecological network is based on the following criteria: Avoid the fragmentation and isolation, increase the functionality of the existing corridors used for the fauna transferring and migration (including the watercourses, the vegetation and the tree-lines), create new knots or linear elements of the ecological network and modify the existing tracts according to the distribution of trees and vegetation in order to guarantee the connection of flora and fauna to the city.

The integration of the ESs into the urban planning is based on specialized studies that are part of research on the distribution of the zoological and botanical diversity in the green areas.

The chart of the ecological classes introduces a set of indicators related to the flora and fauna biodiversity. Another section focused on the 64 urban green spaces, spread out in the whole municipal territory and intended for a garden or public park, with special emphasis on their capacity to accept animal and vegetation species. The gathered data allowed to define a strategy of improvement of those areas, ecological potential, and a final synthetic value expressing their ecological suitability.

The indicators of the municipal green areas concerned five pivotal aspects: Flower quality, habitat quality, soil quality, extension of the green area, quality of the surroundings of the green area. The overall value of the green area is the result of the summation of these five parameters.

The plan examines the existing ecological areas in need to become more efficient, the so-called "areas for the environmental upgrading". It also defines rules and criteria to address the public interventions in those areas, with specific provisions regarding the botanical and zoological species to use and how to ensure their fruition. Moreover, the new public and private developments represent opportunities to improve the blue and green infrastructures and to complete or regenerate the ecological network.

The RU introduces the concept of "ecological class", refereed to the ecological potential determined by a synthesis between botanic and the zoological components. The ecological classes

and the continuity of the urban network have allowed us to pinpoint possible defects or potential value points that can become a basis for future projects to guarantee and develop the functionality of the ecological network.

Table 6. Results of the analysis. The case of the Urban General Plan of Florence.

ANALYSIS	
Biophysical structure and processes	Identification of the ecological network, subdivided into core areas, ecological corridors, stepping zones, and buffer zones. Mapping of green urban areas and green periurban areas. Definition of the concept of ecological class, which refers to the ecological potential determined by a synthesis between botanical and the zoological components, setting up qualitative indicators for biodiversity. Census of the UNESCO historic settlement and recognition of the significant post-war architectures.
Functions	Ecological network aimed to build connections of natural and semi-natural environments, in order to support species in transit and host microenvironments in critical situations. Identification of the historical heritage in order to preserve the local identities.
Services	Guarantees of the graduality of the habitats, the mobility of the species, and the genetic exchange.
Benefits and values	Benefits are implicitly defined but not assessed in terms of their results and quality.
STRATEGIES AND ACTIONS	
Conservation	Safeguard of existing ecological network elements. Environmental monitoring. Historical heritage preservation.
Regeneration	Redevelopment of some existing sections of the ecological network.
Enhancement	Completion and strengthening of the territorial ecological network and improvement of natural dynamics of renewal of resources. Strengthening of internal and external connections to the ecological network. Development of compatible economic activities, in order to contribute to the protection of ecological values. Realization of new ecological knots.

The plan provides the enhancement of the service system with the application of non-financial compensation and expropriation tools for the acquisition of private areas and the achievement of a standard of 30.9 square meters for each inhabitant. In the new developments project, the urban standards required by the national legislation must be guaranteed anyway.

5. Discussion

In Italy, the explicit and voluntary use of the ES concept in spatial planning is still limited [21,80–82]. As shown by the review of Italian land use plans analyzed, the model of the ecological network integrates settlements, infrastructures, and natural components, following a new approach to the environmental preservation to achieve the goals of high-quality landscape and sustainable development [82].

In this direction, the urban planning focuses on the improvement of the urban green system in the new development projects, recognizing the ecological values and benefits provided by private green areas, adjacent and connected to the new settlements, used as public parks and gardens, although directly managed by private owners.

The widespread diffusion of green areas in the city and the construction of ecological networks, which combine public green areas with new private areas of ecological interest, can be an effective tool to tackle the problems generated by ongoing development [39], going beyond the concept of urban standard of green areas, recognizing their contribution in terms of benefits provided regardless of ownership.

The protection of the natural heritage and the ecological functionality of the territory does not require the acquisition of the property by the public authorities.

Table 7. Summary of the comparative case study analysis.

		BOL	ROM	MIL	FLO
ANALYSIS					
Biophysical structure and processes	Identification of the spatial components of existing or potential ecological networks	●●●	●●●	●●●	●●●
	Analysis of the structure, the processes and the biophysical function of ecosystems	●●	●	●●	●●●
Functions	Description of ecosystem properties or urban areas potentialities in terms of ecosystem functions	●●	●	●●	●●●
Services	Identification of the final services and products provided to the community by ecosystems	●●	●	●●	●●
Benefits and values	Data on the influence of ecosystems on human well-being in terms of benefits and values provided	–	–	–	●
STRATEGIES AND ACTIONS					
Conservation	Strategies and actions aimed at preserving the health and the functionality of ecosystems	●	●●	●●	●●●
Regeneration	Strategies and actions aimed at restoring the health and the functionality of ecosystems	●●	●●	●●	●●
Enhancement	Strategies or actions aimed at enhancing the existing provision of ecosystem services or creating new ecosystems	●●	●●	●●	●●●

–not considered or not clearly developed; ● inadequate level of detail ●● moderate level of detail ●●● good level of detail.

In Table 7, the results of the comparative case study analysis are summarized according to the theoretical framework described in the methodological section. All the plans identify in detail the spatial components of the municipal ecological networks, both existing or potential. Starting from similar and good levels of detail in the description of biophysical structures and processes, there is a progressive reduction in the quality of analysis and information according to the sequence described in the Cascade model. This assumption is confirmed by an inadequate analysis of the ecosystem properties and functions, excepted Florence that shows in-depth knowledge of urban ecosystem potentialities. The plans appear even more deficient in the identification of final ecosystem services and products for the community, while the data on the assessment of benefits and values for the human well-being are almost absent. The plan of Florence represents an example of partial integration of the issue of ESs in spatial planning to extend the benefits derived from the environmental protection policies to the system of common goods and infrastructures. In the case of Milan, the Plan of Services is structured by a dynamic path of identification of the real demand for the satisfaction of the community needs, but it did not developed a quantitative and qualitative assessment of the benefits provided by ESs. It is particularly innovative in terms of evaluation of the

accessibility, usability, and feasibility of the collective services, but it is only an analytical tool, mostly inefficient as regards the realization, adaptation, and improvement of the public services [79,83].

Research highlights a defective awareness in defining the meaning of ESs outside the scientific and academic field and a difficult transfer of specialized knowledge in practices [27,84–86]. The mapping of the ESs should contribute to the territorial governance and is pivotal for the full acknowledgment of the environmental sustainability of the actions of land use and transformation provided by plans and to evaluate their consequences [86,87].

The ESs offer the opportunity to improve the land use planning, considering their direct contribution to the amelioration of the life quality and the welfare of the community [88,89]. In this direction, new environmental ecological standards have generally been recognized in the analyzed plans, but they are not linked to the services and benefits provided by the ecosystems. These parameters usually refer to strategies and actions for the conservation, regeneration, and enhancement of the environmental and ecological system (soil permeability, carrying capacity, non-renewable resources consumption, size and composition of green biomass, urban microclimate, air quality, noise reduction) [31,39]. Strategies and actions usually refer to the conservation and regeneration of the ecological networks without awareness of the positive consequences in terms of ecosystem services provisions. Only Florence evaluates the state of conservation of ESs in the urban area and the expected effects of development projects.

6. Conclusions

Over the last several decades, in the international context, the urban planning research has innovated and perfected methods and tools used to analyze and evaluate the indispensable functions that the ecosystem is capable of supplying to a large number of stakeholders. ESs becomes fundamental to foster the preservation of biodiversity and landscape that are seen as crucial contributors to human welfare. The paper demonstrates that the integration of ESs into planning enables connecting environmental protection with other community goals, such as the realization of green and blue infrastructures and public spaces. For this reason, it is fundamental to intensify the studies about the ESs and set up protocols to incorporate them into the spatial planning, avoiding the application of undifferentiated parameters disconnected from the local identity.

The scientific literature has provided plenty of indicators to measure the benefit generated by the ESs for the life quality of settled communities. In the Italian example, the previous planning experiences used strategies of sustainable development that, although kept in consideration the ecological function of the land, often used ineffective preservation and monitoring measures. The traditional model of urban standards, introduced to guarantee a fair and minimum ratio between public and private spaces in the city, needs a substantial revision to consider ESs in the urban environment as a field of options available to society. ESs should represent services to inhabitants to be guaranteed, therefore, resources to safeguard or restore in the local planning strategies.

The definition of the new quality standards has to take into account the ever-changing and heterogeneous factors affecting the urban welfare directly. We recommend that it is fundamental to define a model of collective services and infrastructures in order to improve the life quality of the community and, at the same time, to ensure the preservation of the common goods. In the territorial and urban plans, the quantitative and qualitative criteria (namely "urban quality standards") should control the human pressure on the natural environment, as well as improve the health of the cities, through lower consumption of non-renewable resources, a rebalance and mitigation of the anthropic impact and the enhancement of the ecological and environmental system.

Moreover, the definition of innovative thresholds and qualitative standards referring to human well-being, shared at the European and international level, can help prevent the speculation and exploitation of the common goods, the trampling of the rights of the people and the consequent decrease of the community welfare. At the same time, the necessary flexibility and adaptability to the specific territorial situations can be guaranteed.

Author Contributions: Conceptualization, A.M.C, A.F. and S.S.; methodology, A.M.C, A.F. and S.S.; investigation, A.M.C, A.F. and S.S. All authors have read and agreed to the published version of the manuscript. All sections are jointly written by the authors, except to Section 1, written by A.M.C., Sections 4.1 and 4.4. written by S.S, Sections 4.2 and 4.3, written by A.F.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. List of the Analyzed Official Documents

Plans	Documents (*Official Name*)
Municipality of Bologna, Piano Strutturale Comunale,2008, available at http://www.comune.bologna.it/psc/documenti/848 (accessed on 14 January 2020).	Relazione illustrativa Quadro normativo Valutazione di sostenibilità ambientale e territoriale Quadro conoscitivo Tables: Figure della ristrutturazione Strategie per la qualità Regole
Municipality of Rome, Piano Regolatore Generale, 2008, available at http://www.urbanistica.comune.roma.it/images/uo_urban/prg_vigente/prg_nta.pdf (accessed on 14 January 2020).	Norme tecniche di attuazione Sistemi e regole Rete Ecologica Standard Urbanistici Tables and drawings
Municipality of Milan, Piano dei Servizi, 2019, available at: https://www.comune.milano.it/aree-tematiche/urbanistica-ed-edilizia/pgt-vigente/piano-dei-servizi (accessed on 14 January 2020).	Relazione Generale Norme e ambiti a servizi Catalogo, NIL e servizi Accessibilità Rete ecologica Tables and drawings
Municipality of Florence, Piano Strutturale Comunale. Relazione Illustrativa, 2014, available at http://pianostrutturale.comune.fi.it/documenti_del_piano/piano_strutturale_2014_approvata.html (accessed on 14 January 2020).	Allegato A—Relazione Allegato B—Tavole Allegato C—Quadro conoscitivo Tables and drawings
Municipality of Florence, Regolamento Urbanistico. Relazione, 2015, available at: http://regolamentourbanistico.comune.fi.it/documenti/RU_vigente.html (accessed on 14 January 2020).	Allegato A—Relazione Allegato B—Norme tecniche di attuazione Allegato F—Rete ecologica Allegato H—Quadro conoscitivo Tables and drawings

References

1. Lefebvre, H. *Le Droit à la Ville*; Edizione Economica: Paris, France, 1968.
2. Gardi, C. Toward zero net land take by 2050: An EU perspective. In *Growing Compact*; Fregolent, L., Tonin, S., Eds.; FrancoAngeli: Milano, Italy, 2015; pp. 177–190.
3. Wolch, J.R.; Byrne, J.; Newell, J.P. Urban green space, public health, and environmental justice: The challenge of making cities just green enough. *Landsc. Urban Plan.* **2014**, *125*, 234–244.
4. Colavitti, A.M.; Serra, S. Fifty years of service planning in Italy (1968–2018). The evolution of standard toward the efficiency of governance. In Proceedings of the International Conference on Changing Cities IV: Spatial, Design, Landscape & Socio-Economic dimensions, Chania, Crete Island, Greece, 24–29 June 2019; Gospodini, A., Ed.; University of Thessaly: Volos, Greece, 2019.
5. Salzman, J.; Arnold, C.A.; Garcia, R.; Hirokawa, K.; Jowers, K.; Lejava, J.; Peloso, M.; Olander, L. The Most Important Current Research Questions in Urban Ecosystem Services. *Duke Environ. Law Policy Forum* **2014**, *25*, 1–47.
6. Renzoni, C. Cinquant'anni di standard urbanistici (1968–2018). *Radici. Territorio* **2018**, *84*, 21–23.
7. Falco, L. *I Nuovi Standard Urbanistici*; Edizioni delle Autonomie: Rome, Italy, 1987.
8. Contardi, L. Cinque ragioni per tornare a ragionare sugli standard. *Urban. Doss.* **1999**, *21*, 2–5.

9. Daily, G.C. Introduction: What Are Ecosystem Services? In *Nature's Services: Societal Dependence on Natural Ecosystems*; Daily, G.C., Ed.; Island Press: Washington, DC, USA, 1997; pp. 1–10.
10. Costanza, R.; d'Arge, R.; de Groot, R.; Farber, S.; Grasso, M.; Hannon, B.; Limburg, K.; Naeem, S.; O'Neill, R.V.; Paruelo, J.; et al. The value of the world's ecosystem services and natural capital. *Nature***1997**, *387*, 253–260.
11. Daily, G.C. *Nature's Services: Societal Dependence on Natural Ecosystems*; Island Press: Washington, DC, USA, 2008.
12. Millennium Ecosystem Assessment (MEA). *Ecosystems and Human Well-Being*; Island Press: Washington, DC, USA, 2005.
13. De Groot, R.S. *Functions of Nature, Evaluation of Nature in Environmental Planning, Management and Decision Making*; Wolters-Noordhoff: Groningen, The Netherlands, 1992.
14. Rees, W.; Wackernagel, M. Urban Ecological Footprints: Why Cities Cannot be Sustainable and Why They are a Key to Sustainability. In *Urban Ecology. An International Perspective on the Interaction between Humans and Nature*; Marzluff, J., Shulenberger, E., Endlicher, W., Alberti, M., Bradley, G., Ryan, C., ZumBrunnen, C., Simon, U., Eds.; Urban Ecology; Springer: Boston, MA, USA, 2008; pp. 537–555.
15. Cortinovis, C.; Zardo, L.; Geneletti, D. Servizi ecosistemici: Nuovi strumenti per la pianificazione urbana. *Sentieri Urbani* **2016**, *19*, 27–31.
16. Giaimo, C.; Santolini, R.; Salata, S. Performance urbane e servizi ecosistemici. Verso nuovi standard? In *Dopo 50 Anni di Standard Urbanistici in Italia—Verso Percorsi di Riforma*; Giaimo, C., Ed.; INU Edizioni: Rome, Italy, 2019; pp. 63–39.
17. Saxer, S.R.; Rosenbloom, J. *Social-Ecological Resilience and Sustainability*; Wolters Kluwer: New York, NY, USA, 2018.
18. Brauman, K.A.; Daily, G.C.; Duarte, T.K.; Mooney, H.A. The nature and value of ecosystem services: An overview highlighting hydrologic services. *Annu. Rev. Environ. Resour.* **2007**, *32*, 67–98, doi:10.1146/annurev.energy.32.031306.102758.
19. Grêt-Regamey, A.; Celio, E.; Klein, T.M.; Hayek, U.W. Understanding ecosystem services trade-offs with interactive procedural modeling for sustainable urban planning. *Landsc. Urban Plan.* **2013**, *109*, 107–116, doi:10.1016/j.landurbplan.2012.10.011.
20. Biggs, R.; Schlüter, M.; Schoon, M.L. *Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems*; University Press: Cambridge, UK, 2015.
21. Geneletti, D. Reasons and options for integrating ecosystem services in strategic environmental assessment of spatial planning. *Int. J. Biodivers. Sci. Ecosyst. Serv. Manag.* **2011**, *7*, 143–149, doi:10.1080/21513732.2011.617711.
22. Lopes, R.; Videira, N. Valuing marine and coastal ecosystem services: An integrated participatory framework. *Ocean Coast. Manag.* **2013**, *84*, 153–162.
23. Albert, C.; Aronson, J.; Fürst, C.; Opdam, P. Integrating ecosystem services in landscape planning: Requirements approaches, and impacts. *Landsc. Ecol.* **2014**, *29*, 1277–1285.
24. Mascarenhas, A.; Ramos, T.B.; Haase, D.; Santos, R. Integration of ecosystem services in spatial planning: A survey on regional planners' views. *Landsc. Ecol.* **2014**, *29*, 1287–1300, doi:1007/s10980-014-0012-4.
25. De Groot, R.S.; Alkemade, R.; Braat, L.; Hein, L.; Willemen, L. Challenges in integrating the concept of ecosystem services and values in landscape planning: Management and decision making. *Ecol. Complex* **2010**, *7*, 260–272.
26. Colding, J. The role of ecosystem services in contemporary urban planning. In *Urban Ecology: Patterns, Processes and Applications*; Niemelä, J., Ed.; Oxford University Press: Oxford, UK, 2011; pp. 228–237.
27. Salata, S.; Ronchi, S.; Ghirardelli, F. I servizi ecosistemici a supporto della pianificazione paesaggistica. *Territorio* **2016**, *77*, 45–52, doi:10.3280/TR2016-077007.
28. Delphin, S.; Escobedo, F.J.; Abd-Elrahman, A.; Cropper, W.P. Urbanization as a land use change driver of forest ecosystem services. *Land Use Policy* **2016**, *54*, 188–199.
29. Odorisio, C. II dibattito del '68 ed il bilancio attuale. *Urban. Doss.* **1999**, *21*, 6–7.
30. Mocine, C.R. The Legge Ponte, a Step toward More Effective City Planning in Italy. *Urban Law Annu.* **1970**, *187*, 187–195. Available online: https://openscholarship.wustl.edu/law_urbanlaw/vol1970/iss1/11 (accessed on 14 January 2020).
31. Francini, M.; Colucci, M. La ridefinizione degli standard urbanistici quale strategia di rigenerazione urbana. *Urban. Doss.* **2013**, *4*, 439–441.
32. Guzzo, G. *La Pianificazione Urbanistica. Soggetti, Contenuti e Ambiti Applicativi*; Giuffrè Editore: Milano, Italy, 2012.
33. World Health Organization. *Health Indicators of Sustainable Cities in the Context of the Rio+20 UN Conference on Sustainable Development*; WHO: Geneva, Switzerland, 2012.

34. Science for Environment Policy. 2018 Indicators for Sustainable Cities. In-Depth Report 12. Produced for the European Commission DG Environment by the Science Communication Unit, UWE, Bristol. Available online: http://ec.europa.eu/science-environment-policy (accessed on 14 January 2020).
35. Istituto Nazionale di Statistica, BES 2019. II Benessere Equo e Sostenibile in Italia. ISTAT, Roma, 2019, Available online: https://www.istat.it/it/files//2019/12/Bes_2019.pdf (accessed on 18 January 2020).
36. Russo, A.; Cirella, G.T. Modern Compact Cities: How Much Greenery Do We Need? *Int. J. Environ. Res. Public Health***2018**, *15*, 2180, doi:10.3390/ijerph15102180.
37. Urbani, P. *Urbanistica Solidale. Alla Ricerca Della Giustizia Perequativa tra Proprietà e Interessi Pubblici*; Bollati Boringhieri: Torino, Italy, 2011.
38. Centofanti, N. *Diritto di Costruire, Pianificazione Urbanistica, Espropriazione*; Giuffrè Editore: Milano, Italy, 2010.
39. Giallanella, F. Standard urbanistici e piano locale. Indicatori quantitativi e riferimenti prestazionali. In *Piano Locale e … Nuove Regole, Nuovi Strumenti, Nuovi Meccanismi Attuativi*; Ricci, L., Ed.; Franco Angeli: Milan, Italy, 2009.
40. ISTAT, Report Ambiente Urbano. Anno 2018. Rilevazione Dati Ambientali Nelle Città. Tavola 11.1—Disponibilità di Verde Urbano nei Comuni Capoluogo di Provincia/Città Metropolitana—Anni 2014–2018 (m2 per Abitante), 2018. Available online: https://www.istat.it/it/archivio/236912 (accessed on 18 January 2020).
41. Contardi, L. Nuovi standard urbanistici e procedure negoziali. *Urban. Inf.* **1999**, 167, 31.
42. Agger, S.G. *Autogestione Urbana: L'urbanistica per una Nuova Società*; Dedalo Libri: Bari, Italy, 1977.
43. Giaimo, C. La trama. Dopo 50 anni, ripartire dagli standard. In *Dopo 50 Anni di Standard Urbanistici in Italia—Verso Percorsi di Riforma*; Giaimo, C., Ed.; INU Edizioni: Rome, Italy, 2019; pp. 30–40.
44. Bolgiani, I. Attrezzature religiose e pianificazione urbanistica: Luci e ombre. *Stato Chiese Plur. Confess.* **2013**, *28*, 1–23.
45. Moroni, S.; Chiodelli, F. Urbanistica, moschee e altri luoghi di culto. Riflessioni a partire da una recente legge della Regione Lombardia. *Crios* **2016**, *11*, 21–34.
46. Ghiloni, M.; Karrer, F. Verso standard urbanistici convenzionali? *Urban. Inf.* **1999**, 167, 38–39.
47. Karrer, F.; Ricci, M. *Città e Contratto: Il Piano dei Servizi Tra Programmazione Urbana e Gestione*; Officina Edizioni: Rome, Italy, 2006.
48. Gerundo, R.; Fasolino, I.; Grimaldi, M.; Graziuso, G. The performance of urban standards as a way of evaluating the efficiency of facilities in the municipalities of inland areas. *Plurimondi VII* **2015**, *16*, 133–141.
49. Colavitti, A.M.; Serra, S.; Usai, A. Le città metropolitane come motori dello sviluppo: Le risposte della pianificazione territoriale di area vasta alle recenti riforme istituzionali ed amministrative. *Planum* **2014**, *2*, 438–446.
50. La Rosa, D. Accessibility to greenspaces: GIS based indicators for sustainable planning in dense urban context. *Ecol. Indic.* **2014**, *42*, 122–134.
51. Pafi, M.; Siragusa, A.; Ferri, S.; Halkia, M. *Measuring the Accessibility of Urban Green Areas. A Comparison of the Green ESM with Other Datasets in Four European Cities*; JRC Technical Reports, EUR 28068 EN; Publications Office of the European Union: Luxembourg, 2016.
52. Kabisch, N.; Strohbach, M.; Haase, D.; Kronenberg, J. Urban green space availability in European cities. *Ecol. Indic.* **2016**, *70*, 586–596.
53. Dai, D. Ratial/ethnic and socio economic disparities in urban green space accessibility: Where to intervene? *Landsc. Urban Plan.* **2011**, *102*, 234–244.
54. European Environment Agency. *Spatial Analysis of Green Infrastructure in Europe*; European Environment Agency: Luxembourg, 2014.
55. Rossetti, M. La nuova politica dei servizi urbani della Regione Lombardia. Urbanistica Informazioni 2001, 176. Arcidiacono, A., Viviani, S. Nuovi standard per la pianificazione urbanistica. In *Rapporto Consumo di Suolo, Dinamiche Territoriali e Servizi Ecosistemici*; ISPRA: Rome, Italy, 2016; pp. 77–78.
56. Mussinelli, E.; Tartaglia, A.; Fanzini, D.; Riva, R.; Cerati, D.; Castaldo, G. New Paradigms for the Urban Regeneration Project between Green Economy and Resilience. In *Regeneration of the Built Environment from a Circular Economy Perspective*; Della Torre, S., Cattaneo, S., Lenzi, C., Zanelli, A., Eds.; Springer: Berlin/Heidelberg, Germany, 2020; pp. 59–68.
57. Bastian OHaase, D.; Grunewald, K. Ecosystem properties, potentials and services—The EPPS conceptual framework and an urban application example. *Ecol. Indic.* **2012**, *21*, 7–16.
58. Liang, Y.; Liu, L.; Huang, J. Integrated Ecosystem Services Assessment in Urbanizing Regions. In *Integrated Modelling of Ecosystem Services and Land-Use Change*; Springer Geography; Springer: Singapore, 2020; pp. 153–167.
59. La Notte, A.; Rhodes, C. The theoretical frameworks behind integrated environmental, ecosystem, and economic accounting systems and their classifications. *Environ. Impact Assess. Rev.* **2020**, *80*, 106–117.

60. Franchina, A. La Città e la Dimensione Ambientale: Il Paradigma dei Servizi Ecosistemici Nella Pianificazione Alla Scala Urbana. Ph.D. Thesis, University of Palermo, Palermo, Italy, 2018.
61. Gómez-Baggethun, E.; Barton, D.N. Classifying and valuing ecosystem services for urban planning. *Ecol. Econ.* **2013**, *86*, 235–245.
62. Bottero, M.; Bravi, M.; Giaimo, C.; Barbieri, C.A. Ecosystem Services: From Bio-physical to Economic Values. In *Values and Functions for Future Cities. Green Energy and Technology*; Mondini, G., Oppio, A., Stanghellini, S., Bottero, M., Abastante, F., Eds.; Springer: Berlin/Heidelberg, Germany, 2020; pp. 37–50.
63. Bolund, P.; Hunhammar, S. Ecosystem services in urban areas. *Ecol. Econ.* **1999**, *29*, 293–301.
64. Syrbe, R.U.; Grunewald, K. Ecosystem service supply and demand. The challenge to balance spatial mismatches. *Int. J. Biodivers. Sci. Ecosyst. Serv. Manag.* **2017**, *13*, 148–161, doi:10.1080/21513732.2017.1407362.
65. Lilburne, L.; Eger, A.; Mudge, P.; Ausseil, A.-G.; Stevenson, B.; Herzig, A.; Beare, M. The Land Resource Circle: Supporting land-use decision making with an ecosystem-service-based framework of soil functions. *Geoderma***2020**, *363*, 114–134.
66. Haines-Yong, R.; Potschin, M. Common Classification of Ecosystem Services CICES Version 5.1 and Guidance on the Application of the Revised Structure, 2018. Available online: www.cices.eu (accessed on 14 January 2020).
67. Potschin, M.; Haines-Young, R. Defining and measuring ecosystem services. In *Routledge Handbook of Ecosystem Services*; Potschin, M., Haines-Young, R., Fish, R., Turne, R.K., Eds.; Routledge: London, UK; New York, NY, USA, 2016; pp. 25–44.
68. Costanza, R. Ecosystem services: Multiple classification systems are needed. *Biol. Conserv.* **2008**, *141*, 350–352.
69. Wallace, K.J. Classification of ecosystem services: Problems and solutions. *Biol. Conserv.* **2007**, *139*, 235–246.
70. Costanza, R.; de Groot, R.; Braat, L.; Kubiszewski, I.; Fioramonti, L.; Sutton, P.; Farber, S.; Grasso, M. Twenty years of ecosystem services: How far we have we come and how far do we still need to go? *Ecosyst. Serv.* **2017**, *28*, 1–16.
71. Fisher, B.; Turner, R.K. Ecosystem services: Classification for valuation. *Biol. Conserv.* **2008**, *141*, 1167–1169.
72. La Notte, A.; D'Amato, D.; Mäkinen, H.; Paracchini, M.L.; Liquete, C.; Egoh, B.; Geneletti, D.; Crossman, N.D. Ecosystem services classification: A system ecology perspective of the cascade framework. *Ecol. Indic.* **2017**, *74*, 392–402.
73. Díaz, S.; Pascual, U.; Stenseke, M.; Martín-López, B.; Watson, R.T.; Molnár, Z.; Hill, R.; Chan, K.M.A.; Baste, I.A.; Brauman, K.A.; et al. Assessing nature's contributions to people. *Science* **2018**, *359*, 270–272.
74. Adhikari, K.; Hartemink, A.E. Linking soils to ecosystem services: A global review. *Geoderma***2016**, *262*, 101–111, doi:10.1016/j.geoderma.2015.08.009.
75. Krehl, A.; Weck. S. Doing comparative case study research in urban and regional studies: What can be learnt from practice? *Eur. Plan. Stud.* **2019**, 1–17, doi:10.1080/09654313.2019.1699909.
76. Nadin, V.; Stead, D. Opening up the compendium: An Evaluation of International Comparative Planning Research Methodologies. *Eur. Plan. Stud.* **2013**, *21*, 1542–1561, doi:10.1080/09654313.2012.722958.
77. Geneletti, D.; Cortinovis, C.; Zardo, L.; Esmail, B.A. *Planning for Ecosystem Services in Cities*; Springer: Cham, Switzerland, 2020.
78. Corrado, R. *L'urbanistica Italiana Dopo le Sentenze del TAR sul PRG di Roma*; Gangemi Editore: Roma, Italy, 2010.
79. Pogliani, L. L'evoluzione del piano dei servizi. *Territorio* **2009**, *49*, 68–73.
80. La Rosa, D. Why is the inclusion of the ecosystem services concept in urban planning so limited? A knowledge implementation and impact analysis of the Italian urban plans. *Socio-Ecol. Pract. Res.* **2019**, *1*, 83–91.
81. Gibelli, G.; Santolini, R. Reti ecologicalhe e governo del territorio. *Territorio* **2011**, *58*, 61–74.
82. Woodruff, S.C.; BenDor, T.K. Ecosystem services in urban planning: Comparative paradigms and guidelines for high quality plans. *Landsc. Urban Plan.* **2016**, *152*, 90–100.
83. Caldarice, O. La pianificazione dei servizi in Lombardia. Tentativi di innovazione. *Urban. Doss.* **2013**, *4*, 379–381.
84. Scolozzi, R.; Morri, E.; Santolini, R. Pianificare territori sostenibili e resilienti: La prospettiva dei servizi ecosistemici. *Territorio* **2012**, *60*, 167–175.
85. Calzolari, C.; Ungaro, F.; Filippi, N.; Guermandi, M.; Malucelli, F.; Marchi, N.; Staffilani, F.; Tarocco, P. A methodological framework to assess the multiple contributions of soils to ecosystem services delivery at regional scale. *Geoderma***2016**, *261*, 190–203.
86. Burkhard, B.; Maes, J. *Mapping Ecosystem Services*; Pensoft Publishers: Sofia, Bulgaria, 2017; 374p.
87. Banerjee, O.; Crossman, N.D.; de Groot, R.S. Ecological Processes, Functions and Ecosystem Services: Inextricable Linkages between Wetlands and Agricultural Systems. In *Ecosystem Services in Agricultural and*

Urban Landscapes; Wratten, S., Sandhu, H., Cullen, R., Costanza, R., Eds.; John Wiley & Sons: Hoboken: New Jersey, NJ, USA, 2013; pp. 16–27.

88. Teixera da Silva, R.; Fleskens, L.; van Delden, H.; van der Ploeg, M.Incorporating soil ecosystem services into urban planning: Status, challenges and opportunities. *Landsc. Ecol.* **2018**, *33*, 1087–1102, doi:10.1007/s10980-018-0652-x.
89. Fugazza, B.; Ronchi, S.; Salata, S. La ricomposizione degli assetti ecosistemici a partire dalla valutazione delle funzioni dei suoli: Una proposta di green infrastructure per il territorio lodigiano. *Reticula* **2014**, *7*, 103–109.