

THE ROLE OF GREEN AREAS IN THE CITY OF MATERA (SOUTHERN ITALY) AS A RECREATIONAL AND TOURIST POTENTIAL FOR ITS TERRITORY

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Abstract

The growth of population living in city centers, brings with it the need to make people's lives healthier, intervening in urban and peri-urban areas to increase the presence of green spaces, able to control air pollution levels, maintain biodiversity and improve the city's microclimate. The evaporation produced by plants also mitigate the heat peaks of the summer season, while the shading of buildings allows significant savings on energy for air conditioning.

The Italian city with the highest amount of green per capita is Matera. This city has indeed around 59 million square meters of historical green areas: parks, villas and gardens with an historical value. In the present paper, it is presented the *Green Plan for the Municipality of Matera*, designed and implemented as an essential strategic tool to know, enhance, protect and design the green of the city as a system, taking into account the identity of places. The Census of the area, with the support of a GIS tool, covers the entire public green heritage: location of green areas, recognition of botanical species present, detection of the characteristics of the public tree, shrub heritage and the description of the characteristics and forms of use of different areas.

Key words: Green area, touristic fruition, green asset management, recreational and ornamental function, Matera city

Introduction

The "green infrastructure", *i.e.*, a network of natural and semi-natural areas within, around and between urban areas (Tzoulas et al., 2007), is a generator of a variety of ecosystem goods and services. Green spaces refer to urban vegetation and include the urban forests, which consist of all stands and individual trees, parks, gardens, and yards (Taylor et al., 2017). Together with other elements, they are the key components of the urban green infrastructure, that deserve appropriate planning and management (Statuto et al., 2019). An exposure of human beings to natural environments alleviates stress, improves cognitive performance, enhances positive mood, and lowers stress-related illnesses (Hong et al., 2019).

Urban greenery can perform many functions, that are:

- 1) *Ecological-environmental function*: the green spaces, even within the urban areas, constitute a fundamental element of ecological and environmental presence, which contributes substantially to mitigate the effects of degradation and the impacts produced by the presence of buildings and human activities (Statuto et al., 2019). The presence of green contributes to regulate the effects of the city microclimate, through the absorption of toxic elements (SO_x, NO_x, and PM₁₀) produced by vehicle engines, factories and heating of buildings, with a sort of natural "filtering" effect of the air;
- 2) *Protective function*: the vegetation can provide an important effect of protection and preservation of the territory in degraded or sensitive areas (banks of rivers, slopes, areas with danger of landslides, etc.). Vice versa, its removal can, in certain cases, produce sensitive effects of land degradation and instability;
- 3) *Aesthetic - architectural function*: this function is also important considering that the presence of green improves the urban landscape and makes it more pleasant the permanence in the city, so it becomes fundamental to encourage an integration between architectural elements and greenery in the design of urban furniture (Statuto & Picuno, 2017);
- 4) *Social and recreational function*: the presence of parks, gardens, avenues and squares with trees or otherwise equipped with green furniture allows to satisfy an important recreational and social need and to provide a fundamental service to the community, making a city more livable and at size-of-men. In addition, the management of green can allow the formation of specific professionalism and promote the formation of jobs;
- 5) *Cultural and educational function*: the presence of the green area constitutes an element of great importance from the cultural point of view, both because it can promote knowledge botany and, more generally, of natural sciences and environment by citizens, and also for the important educational function (in particular of the green school) for the new generations. In addition, the parks and historic gardens, as well as the plant specimens of greater age or size, constitute real natural monuments, whose conservation and protection are among the cultural objectives of our social consensus;

6) *Health and hygiene function*: the green areas play an important psychological and humoral function for people who enjoy them, contributing to the psychological well-being and mental balance.

Green spaces and trees are fundamental for the sustainability of cities. The use of management and planning indicators for green spaces, including urban forests, have been proposed, but are rarely applied and their potential to provide ecological, social, and economic benefits is usually overlooked by policy makers and managers (Campagnaro et al., 2019).

The Municipality of Matera (Basilicata region – Southern Italy) recognizes the vital importance of the plant heritage as a structural component of the landscape, as a common good to be protected in relation to the unquestionable value for the environment, for the hygiene of the air, water and soil, for the safeguard of the environment, for the protection of the environment present and future, in the qualitative improvement of conditions of life and, finally, for the well-being of people with fundamental repercussions on social aspects.

Material and methods

The City of Matera (Fig. 1) is well-known for its cave-dwelling area (so-called: “Sassi”), a UNESCO World Heritage Site designated since 1993. Beside its historical and cultural aspects, the Matera landscape is made up of important naturalistic elements: the Natural Historic Archaeological Park of “Rock Churches”; a Special Area of Conservation (SAC), as well as a Special Protection Area (SPA), both included in the EU network of protected sites (Natura 2000) (Picuno et al., 2019). In the present paper, a recently established urban planning tool called **Regulation of public and private urban green of the City of Matera** (*Regolamento del verde urbano pubblico e privato della Città di Matera*) is presented, considering the aspect of the Geographic Information System implemented. This information system allows the consultation of all the green areas of the city and contains the cards of about 11,000 trees surveyed to date. The total number of trees present over the territory is estimated at about 13,000 elements (including trees and shrubs). This tool is provided to the municipal technical structures with the aim of optimizing and making more efficient the management of green areas (Fig. 2) with particular attention to the planning of maintenance activities.

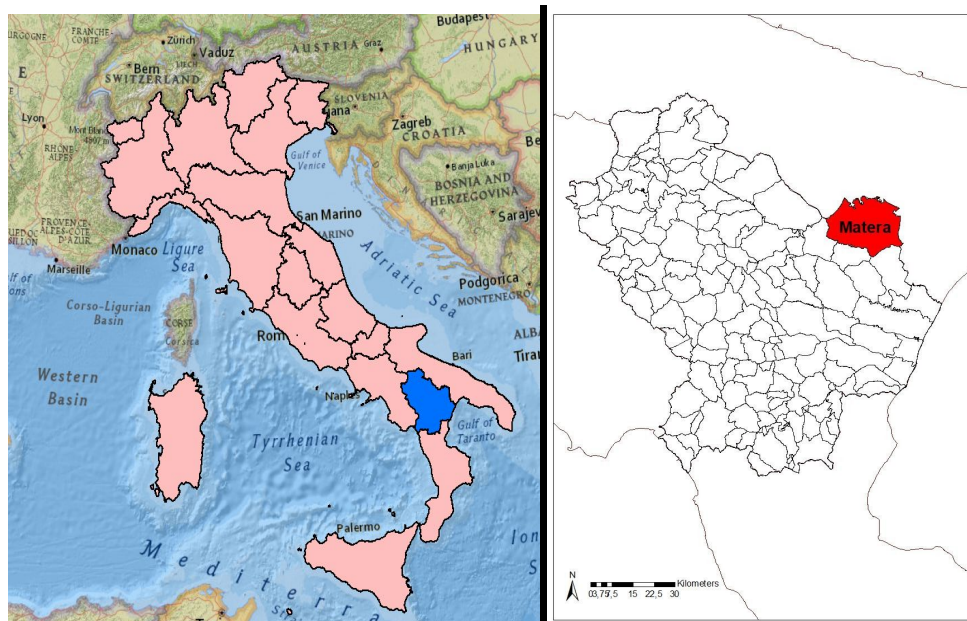


Fig. 1: Study area – Matera Municipality

The system enables a transparent access to the information also to the citizens allowing, through the search and the interrogation of the represented elements, to know better the arboreal heritage of their own city.

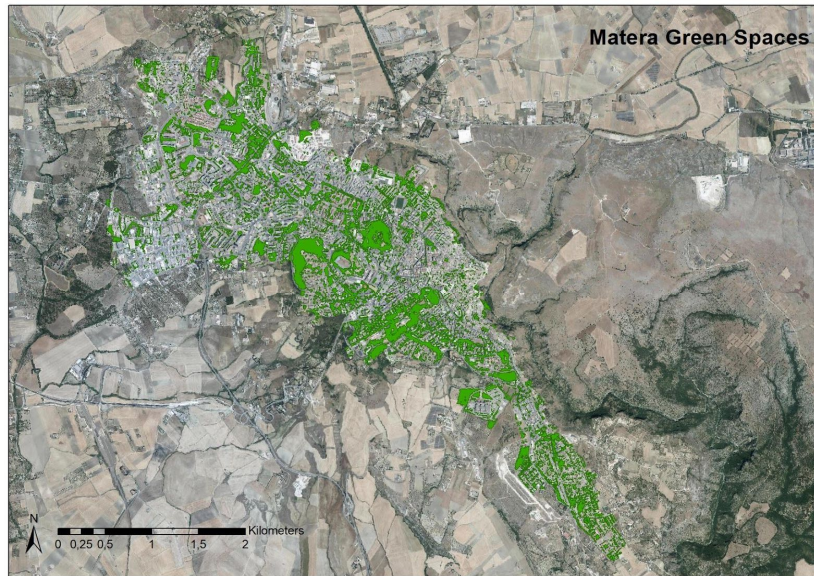


Fig. 2: Matera Green Spaces

Results and Discussion

The Census of Green, through the use of geo-location systems (GIS and GPS) and the affixing of a numeric or alphanumeric code, identifies the green subject detected with evidence of the following parameters (Matera Municipality, 2021):

- taxonomy (genera and species, indicated by the scientific name and common names, varieties, belonging to plant communities);
- biometric characteristics;
- quantitative (quantity subdivided by height classes, surface areas of green areas and grassy parts, etc.), qualitative (health status, location, maintenance needs, interventions) and functional characteristics (contribution provided in terms of ecosystem services) of the patrimony trees, shrubs and grasses;
- historical environmental and landscape value, in relation to the territorial context, consistency, prevailing interest landscape and ecological, also for the purposes of the contribution to the absorption of CO₂, recreational and educational - cultural interest.

According to the reports, the city's estimated plant heritage has the characteristics shown in Table 1.

Tab. 1: Public green space in Matera

DATA	VALUE
Population at the date of 31.08.2020 (Demographic Offices of the Municipality of Matera)	60,407 inhabitants
Surface area of the municipal territory	392.09 sqkm
Total surface of green areas surveyed	1,192,121.964 sqm
Average amount of green per inhabitant	19,74 sqm
Number of trees (February 2021)	about 11,000
Urban and suburban wooded areas	457,160 sqm
Average number of trees per inhabitant	0.2 trees/inhabitant

In addition to the quantitative estimation of the present public green it is possible to visualize in the geographic system also the distribution of the green spaces, in the different zones of the city (Fig. 3).

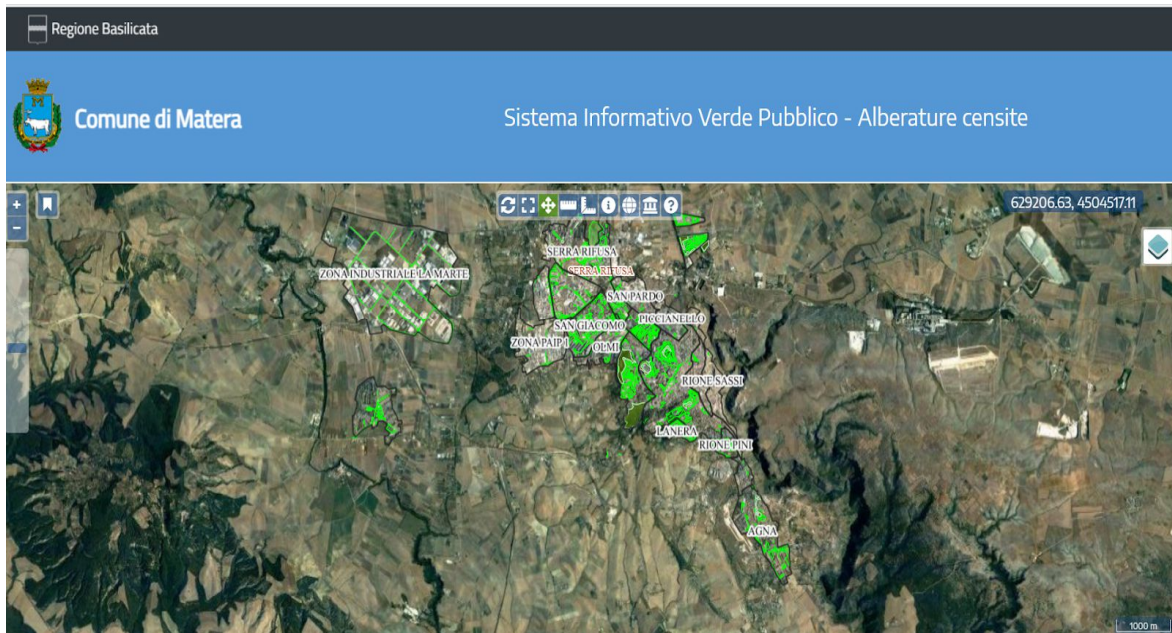


Fig. 3: screen of the green spaces area detected

Furthermore, by consulting the published database, it is also possible to verify the characteristics of the trees within the city, since they have been catalogued considering the characteristics of the species, height, leaf, geolocation, whether it is a historical specimen, etc. This information, as well as being visible and organized in tabular form, can be viewed by clicking directly on the symbol of a tree displayed in the Information System (Fig. 4).

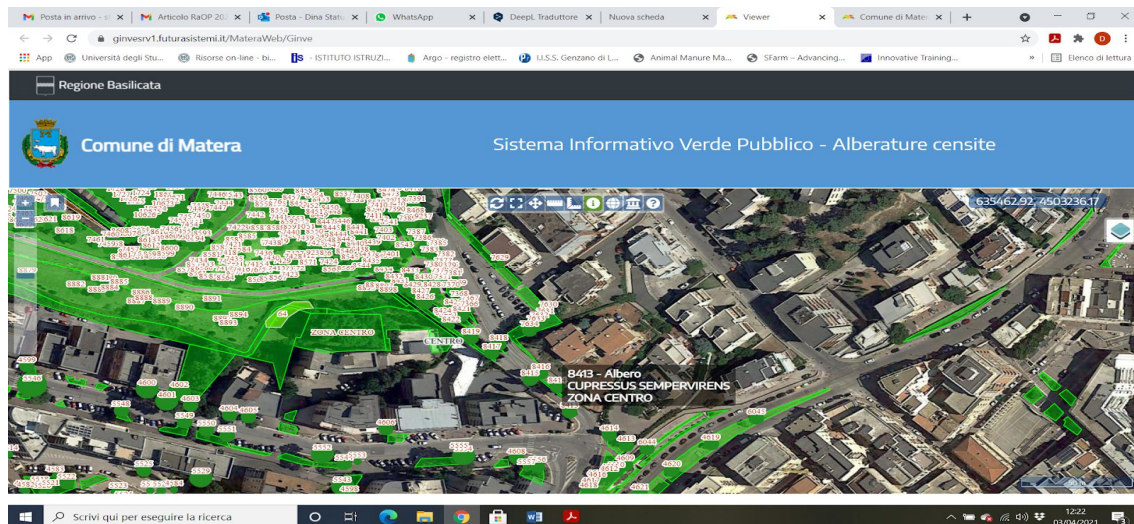


Fig. 4: Public Green Information System - trees surveyed. Species detail for the tree 8413

Conclusion

The Municipality of Matera recognizes the vital importance that the green heritage has like a structural component of the landscape, as a common asset to be protected in relation to the unquestionable value for the environment. The *Regulations of Public and Private Green the Municipality of Matera* here presented govern, within the principles of the order of local autonomies, the direct activity to the safeguard, the use, the planning and realization, the fruition and proper management of the green of the Municipality of Matera, promoting, to this end, the participation of citizens and their associations.

References

Campagnaro, T., Sitzia, T., Cambria, V.E., Semenzato, P. (2019). Indicators for the Planning and Management of Urban Green Spaces: A Focus on Public Areas in Padua, Italy. *Sustainability*, 11, 7071; doi:10.3390/su11247071.

- Hong, S.K., Lee, S.W., Jo, H.K., Yoo, M. (2019). Impact of Frequency of Visits and Time Spent in Urban Green Space on Subjective Well-Being. *Sustainability*, 11, 4189; doi:10.3390/su11154189. <https://ginvesrv1.futurasistemi.it/MateraWeb/projects/statistiche.html>
- Matera Municipality (2021). Regulation of public and private urban green of the City of Matera. (Regolamento del verde urbano pubblico e privato della Città di Matera).
- Picuno, P., Cillis, G., Statuto, D. (2019). Restoring biodiversity in a highly-intensive touristic urban area: A case study in the city of matera (southern Italy). In: *Public Recreation and Landscape Protection - With Sense Hand in Hand? Conference Proceeding 2019*, Krtiny; Czech Republic; May 2019, pp. 339-343.
- Statuto, D., Cillis, G., Picuno, P. (2019). Visual quality indicators for assessing landscape characteristics and managing its protection. In: *Public Recreation and Landscape Protection - With Sense Hand in Hand? Conference Proceeding 2019*. pp. 476–480.
- Statuto D., Picuno P. (2017). Valorisation of vernacular farm buildings for the sustainable development of rural tourism in mountain areas of the Adriatic-Ionian macro-region. *Journal of Agricultural Engineering*, XLVIII (S1):643, pp. 21-26.
- Statuto D., Cillis G., Picuno P. (2019). GIS-based analysis of temporal evolution of rural landscape: A case study in Southern Italy. *Natural Resources Research*, Vol. 28, No. SI, August 2019, S61- S75.
- Taylor, L.; Hochuli, D.F. (2017). Defining greenspace: Multiple uses across multiple disciplines. *Landscape and Urban Planning*, 158, 25–38.
- Tzoulas, K.; Korpela, K.; Venn, S.; Yli-Pelkonen, V.; Kaźmierczak, A.; Niemela, J.; James, P. (2007) Promoting ecosystem and human health in urban areas using green infrastructure: A literature review. *Landscape and Urban Planning*, 81, 167–178.

Souhrn

Za účelem občanům umožní jeho dobré uskutečnění. Tato studie identifikuje nejdůležitější funkci zelených veřejných prostranství, nařízení veřejné a soukromé zeleně, které zde představila obec Matera, v úmyslu chránit městskou zeleň, v souladu s Ústavou Italské republiky, která zahrnuje ochranu krajiny mezi její základní principy. Aby občané podpořili znalosti veřejné zeleně a umožnili jim podílet se na její správě a odpovědnosti za její správu, zřídila obec snadno přístupný Informační systém obsahující charakteristiku zelených ploch.

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