Università degli Studi di Palermo

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A PEOPLE-CENTERED APPROACH TO HISTORIC GARDENS: THE INFLUENCE OF SOCIAL, POLITICAL AND ECONOMIC FACTORS ON MANAGEMENT AND FRUITION

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CICLO XXXV
ANNO 2022

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Abstract

Historic gardens are heritage properties of great environmental, cultural, social, political and economic value, yet they are also precarious because they are composed of living elements. Their survival, in fact, depends on constant care.

This research project seeks to analyze the social, political and economic factors influencing the management and fruition of historic gardens to improve their conservation and ability to contribute to human wellbeing and quality of life. These themes are both missing from existing literature and relevant to current trends in historic garden conservation and fruition made even more evident by the COVID-19 pandemic.

Various research methodologies are applied in pursuit of the research aim, including: qualitative interviews providing a first-hand account of the motivations and struggles of those who care for historic gardens; a systematic review of the literature to trace the development of themes and trends in the research and identify significant gaps; document content analysis to make sense of the various political entities and instruments governing historic gardens; spatial analysis to investigate the potential and actual influence of heritage lists on recreational ecosystem service demand; the zonal travel cost method to assess the actual economic value of recreational ecosystem services created by an event in a historic garden.

Some of the investigations conducted as part of the dissertation use the city of Palermo (Italy) as a case study to analyze the problems affecting historic garden management and fruition. Palermo's parks and gardens have been celebrated throughout history, and they still make up most the city's green spaces. However, they are also recognized as being neglected and deteriorating. Palermo is also a good model for internationally relevant issues related to historic gardens, including the effect of economic and health crises on the management and fruition of green spaces, public austerity, dysfunctional bureaucracy, sustainable development and wellbeing, making the results of these investigations relevant internationally as well as locally.

The results of this research provide a people-centered perspective on the management and fruition of historic gardens. By considering the social, political and economic contexts in which they exist, the research identified developments in natural and cultural heritage practice, policy and planning that have important implications for historic garden management and fruition. Recent policy has focused on issues of sustainability and wellbeing, and consequentially put more emphasis on the experiences these heritage sites provide and on the stakeholders they involve. With this perspective, public engagement initiatives organized in historic gardens play an important role in involving the community, creating meaningful experiences and creating economic value. They are human inputs that transform potential cultural ecosystem service benefits into actual benefits.

These findings also have implications for the governance, planning management and fruition of other resources valued for their cultural ecosystem services. The research presented here can also be fruitfully applied to investigations of the various cultural ecosystem services provided by such areas as urban green spaces, cultural landscapes and nature reserves. These qualitative, spatial and economic assessments are necessary to ensure that public policy measures, investments, and private or non-profit management strategies are effective in meeting their objectives to contribute to human wellbeing and conserve resources for the future.

Acknowledgements

This doctoral research would not have been possible without the many people who guided and supported me during the journey.

I would like to express my deepest gratitude to my two supervisors, Prof. Emanuele Schimmenti and Prof. Valeria Borsellino. I am grateful for their patience and guidance, for the trust they placed in me throughout my doctoral studies, and for the time and attention they dedicated to helping me improve. Thank you for giving me the freedom to follow my interests, encouragement to persevere, fresh perspective when I was overwhelmed, and guidance when I was overextended.

I am also especially grateful to the Department of Agricultural, Food and Forest Sciences, where I began learning as a translator and was welcomed first as a graduate student and then as a doctoral student. Your generosity and dedication to your students is really quite special.

A particular thanks to the Doctorate program's Coordinator, Prof. Vincenzo Bagarello, who kept an even keel and provided direction and encouragement during these sometimes-difficult years.

I am also grateful to the wider community of the Università degli Studi di Palermo and would like to thank: the many faculty members who offered me their knowledge, support and encouragement; the administrators and technical staff who helped me with practical matters; and the colleagues with whom I shared experiences and friendship.

I would also like to thank all the owners and caretakers of Palermo's historic gardens who generously gave me their time and considerations. Thank you for dedicating yourselves to keeping these wonderful places alive and helping them flourish.

I would like to express my appreciation and love for my family, who bestowed upon me a curiosity regarding society's inner workings, an affinity for learning, and many cherished memories in the parks and gardens of my youth.

Most of all, I would like to thank Manlio and Flora. I am so fortunate to have you at my side. You have dedicated your time and often sacrificed your comfort to help me continue my studies. It has been a long road, and I couldn't have made it to the destination without you.

Thank you all!

Chapter 1 - Introduction

1.1 An Introduction to Historic Gardens

1.1.1 Defining Historic Gardens and their Significance

Historic gardens are clearly defined cultural landscapes that have been "designed and created intentionally by people" (UNESCO, 2021, pt. 47.bis). The term historic garden can be applied to many kinds of spaces, ranging from small private gardens to large public parks, as long as they are unified architectural and horticultural compositions that are primarily made up of living plants (ICOMOS-IFLA, 1982, pts. 1–2, 6). Since historic gardens are made up of elements that grow, age and decay, they require continuous care by specialized experts whose interventions are based on thorough research (ICOMOS-IFLA, 1982, pts. 11, 15). Finally, their public access and use should be encouraged but must be regulated to make sure that their authenticity and integrity are preserved (ICOMOS-IFLA, 1982, pts. 18, 21, 25).

Like all landscapes, historic gardens are both natural and cultural heritage and as such they are socially, culturally, economically, environmentally and politically significant. They contribute to the formation of local cultures, the consolidation of communal identity, individual and social wellbeing and quality of life as well as providing an important environmental and economic resource of public interest (European Landscape Convention, 2000). They hold special historic and artistic importance for people because they have endured over time, and testify to a culture, a style, an age, a significant event or person from the past (ICOMOS-IFLA, 1982, pts. 1, 5). They are often visited as outdoor museums and studied by students and scholars, and thus are also of great educational and scientific value. Like all urban green spaces, historic gardens are environmentally significant because they contribute to providing food and habitat for many forms of life, help regulate the climate as well as water and nutrient cycles, preserve and contribute to the formation of fertile soil, and reduce noise and pollution (Basnou et al., 2015; Neonato et al., 2018; Pinto et al., 2022). Historic gardens are economically significant because they function as both market and non-market goods (Askwith, 2009; Tempesta, 2016). Their management often entails substantive operational and capital costs, and they provide employment to their workers as well as to their surrounding areas by incentivizing tourism and improving neighborhood attractiveness and raising property values (Benfield, 2021b; Brandt & Rohde, 2007; Paiva et al., 2020). Some historic gardens are publicly funded, and some create income by charging an entrance fee or by charging for visitor services such as guided tours, dining, parking, special events, etc. and some may sell books, products or plants in a connected gift shop or nursery (Benfield, 2021a; Catahan & Woodruffe-Burton, 2019). However, most economic benefits created by historic gardens are external to the marketplace and benefit society as a whole (Askwith, 2009; Tempesta, 2018b). Thus, all historic gardens are public or semi-public goods and require political interventions to make sure that they are governed in such a way as to assure that their public benefits are adequately supplied and equitably distributed (Tempesta, 2016).

Historic gardens rely on functioning ecosystems to provide all these aforementioned contributions to individuals and society. Hence, in scholarly literature and public policy these contributions are often referred to as ecosystem services, a conceptual framework mainstreamed by the Millennium Ecosystem Assessment in 2005 (MA, 2005) by categorizing them into supporting, provisioning, regulating, and cultural services to measure, account for, and assess the flow of biotic and abiotic natural capital from ecosystems to people (Haines-Young & Potschin, 2018). While the ecosystem service approach has been criticized for some of its limits, it remains one of the most widespread and accepted conceptual framework to integrate natural accounting into science and policy (Chan et al., 2012; Kadykalo et al., 2019; Lautenbach et al., 2019). For historic gardens, which are built and maintained by people for people, this anthropocentric "nature-for-people" and management-oriented ecosystem service

approach (Mace, 2014) seems particularly useful and appropriate. This is especially true if the original motivations of historic garden creators are considered. Although the terminology describing their contributions has changed, the historic gardens that we enjoy today were often built with human wellbeing in mind and they have endured because they continue to inspire people to take care of them.

1.1.2 Gardens for Welfare and Sustainability in the Past and in the Present

While the existence of gardens dates to the beginnings of civilization (Venturi Ferriolo, 1989), during much of history they could only be enjoyed by the privileged few. This began to change during the early Victorian period, when the rising middle class was invited into the parks and gardens of the landed gentry (Connell, 2005), and paid for access to such recreational spaces as private squares and pleasure gardens (Rogers, 2001). Concern over the social costs of urbanization, and consequent public health crisis spurred industrializing city governments to build the first fully public urban green spaces. Initial models included people's parks in continental Europe, public walks in Great Britain and park-like rural cemeteries in both Europe and the United States (Chadwick, 1966). When worry over the ill effects of city life grew in the 19th century, the public parks movement swept the Western world and urban park systems became one of the many responsibilities of municipalities (Conway, 2014). Such pioneers as Joseph Paxton in England, Baron Haussmann in France and Frederick Law Olmsted in the United States provided some of the classic models for public park design and governance (Jellicoe & Jellicoe, 1995).

These 19th century public urban green spaces were primarily valued for their social benefits. Specifically, they were meant to act as urban lungs, bringing fresh air into the polluted city and elevate the morality of the working classes by providing spaces for socially approved and family-centered recreation (Chadwick, 1966; Collins, 2020; Jones, 2018). Today, the Victorian's intuitions that parks and gardens positively affect social and individual wellbeing have been confirmed by a plethora of research (Olsen et al., 2019; Ward Thompson et al., 2012; Wolch et al., 2014) and access to a high-quality park or green space within a short walking distance is now considered an important indicator of quality of life (WHO Regional Office for Europe, 2017 a; WHO Regional Office for Europe, 2017 b). In fact, the United Nation's 2030 Agenda for Sustainable Development includes target 7, "by 2030, provide universal access to safe, inclusive, and accessible green and public spaces, in particular for women and children, older persons and persons with disabilities" as part of Sustainability Development Goal (SDG) 11, "make cities and human settlements inclusive, safe, resilient and sustainable" (United Nations, 2015a).

In nations with historic urban centers containing a rich patrimony of historic parks and gardens, many public urban green spaces are also cultural heritage sites, valued for their historic, artistic, aesthetic and identity traits (Rostami et al., 2015). Cultural heritage has long been used as an instrument to consolidate national identity (Lowenthal, 2015), but it became internationally recognized as important after the large-scale destruction of heritage in Europe during the two World Wars. Inter-governmental agencies such as the United Nations Educational Scientific and Cultural Organization (UNESCO) and the International Council of Monuments and Sites (ICOMOS) were formed to protect and promote all forms of heritage, including historic parks and gardens (Goetcheus & Mitchell, 2014). Today, cultural heritage is increasingly also recognized as an important contributor to quality of life and wellbeing and as a principal component of sustainability (Rostami et al., 2015). For example, its importance is recognized by SDG11 in target 4, "strengthen efforts to protect and safeguard the world's cultural and natural heritage" (United Nations, 2015a).

By the turn of the 21st century, concern for the environment and for sustainability became mainstream. Parks and gardens also came to be recognized for their environmental value and importance for the ecological fitness of the urban environment. They began to be designed and managed to contribute to environmental goals such as resource, habitat and biodiversity conservation, as well as water and soil management, pollution abatement and land reclamation. Furthermore, their social contributions were reinterpreted within the sustainability framework, with increased emphasis on education, stewardship, social cohesion and community participation (Cranz & Boland, 2004). Today, these urban green spaces are also valued because they contribute to urban sustainability (Rostami et al., 2015), supporting city functioning as green infrastructure (Basnou et al., 2015; Lourdes et al., 2022; Valente et al., 2020).

Each of the historic stages in public park and garden development was made possible by political and economic policy promoting the objectives of the time. For example, Great Britain's Victorian parks were funded thanks to new policy measures allowing public authorities to purchase land, including the 1843 Act of Parliament funding Birkenhead Park, the 1859 Recreation Grounds Act, the Public Health Acts of 1848 and of 1875, The 1871 Public Parks Act, The Open Spaces Act of 1877 and the Disused Burial Grounds Act of 1884 (Chadwick, 1966; Jordan, 1994). Indeed, throughout history, public park and garden development has gone forward because governments and private individuals have also recognized the economic benefits provided by public urban green space. In the United States, the bill authorizing New York's acquisition of land for Central Park went through because of the expected consequent increase in park-side real estate value and immigrant employment opportunities (Rogers, 2001).

The historic development of historic park and garden governance bears remembering, because it continues to be in flux. While public parks and gardens are valued according to all three pillars of sustainability (social, environmental and economic) and can be seen as contributing to all the SDGs directly or indirectly (Pinto et al., 2022), past policy measures have seemed to focus on the aspects of sustainability most relative to the place and period where they are created. Furthermore, government responsibility is not a given. The pendulum may swing back towards privatization, as government austerity may be driving a turn once more towards more public-private and fully privatized park and garden management models (Arena, 2015; Milbourne, 2021).

1.1.3 Critical Issues with Historic Garden Management and Fruition

Historic gardens were formally defined and designated as "living monuments" by the Florence Charter, drafted in the Tuscan city of the same name and approved in 1982 by a joint committee composed of members of the International Council on Monuments and Sites (ICOMOS) and the International Federation of Landscape Architects (IFLA) (ICOMOS-IFLA, 1982). To this day, this document remains the most cited international guide on the recognition and treatment of historic gardens (Funsten et al., 2020). Since then, historic gardens have been recognized and protected by various binding and non-binding laws and guiding documents pertaining to natural, cultural and landscape heritage governance. Other well-known international policies regarding to historic gardens include the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Convention (1972) and the European Landscape Convention (2000).

At a national level, historic gardens are often covered by heritage protection and land-use planning laws. In Italy, the protection of the nation's heritage and landscape is part of the Italian Republic's Constitution (*Costituzione della Repubblica Italiana*, 1948, art. 9). In 2022, an amendment also added the protection of the nation's environment, biodiversity, and

ecosystems (*Legge Costituzionale* 11/02/2022, no. 1). During the first half of the 20th century, the national Ministry of Culture was responsible for carrying out these responsibilities, but over time more responsibility has been handed over to different regional and municipal government offices (Tempesta, 2018b). Today, the Cultural and Landscape Heritage Code (*Codice dei Beni Culturali e del Paesaggio*, 2004) identifies "villas, parks and gardens that are of artistic and historic significance" as cultural heritage (art. 10, comma 4, letter f) and provides instruments for protecting not just the gardens themselves, but also the context in which they are found.

However, despite their recognized significance, historic gardens are often not taken care of adequately. One of the critical problems is a lack of knowledge of the sites (Pirrone et al., 1989). Since it's institution, Italy's heritage cataloguing authority, the *Istituto Centrale per il Catalogo e la Documentaione* (ICCD), whose role is defined by article 17 of the Italian Heritage Code (*Codice dei Beni Culturali e del Paesaggio*, 2004), includes historic parks and gardens as a category in its national heritage list. However, many sites of recognized significance remain unlisted, especially in Sicily. Another critical problem is the appropriate care and eventual restoration of historic gardens by qualified individuals (Accati & Devecchi, 2005). When they are not cared for adequately, economic, social and environmental benefits are lost, making it essential to create greater awareness of the value of historic gardens amongst stakeholders as well as define clearer criteria for both their governance (Tempesta, 2018b) and management (Cazzani et al., 2019). In fact, much of the literature on historic garden management notes that current policy does not effectively conserve historic gardens (Funsten et al., 2020).

1.2 Research Objectives and Dissertation Structure

This doctoral dissertation aims to address the study of historic garden management by analyzing the above-mentioned critical issues with a people-centered approach. Without caretakers and visitors, gardens lose their central identity as a place cultivated for enjoyment. However, their survival depends on individual and collective commitments to constant resource-intensive care. While there is significant body of literature regarding historic garden conservation, most of it concentrates on the garden itself, i.e., it's biotic and abiotic components, but not on the people who animate it (Funsten et al., 2020). Yet, these tangible elements become meaningful through people's embodied experiences (Moser, 2023). Thus, it would seem that the interconnection between historic gardens and people, including their social, political and economic systems, is an untapped area of study with important implications for the conservation of these living heritage sites as well as for human wellbeing and quality of life.

With these considerations in mind, this dissertation focuses on these social, political and economic factors, investigating how they influence historic garden management and fruition. It aims to offer various approaches to the socio-economic problems of managing historic gardens by taking advantage of transdisciplinary methodologies from the social, agricultural and environmental sciences related to the study of humans, their environment, and the landscape. In this regard, the ecosystem service concept is especially useful in evaluating the benefits people receive from nature in a holistic fashion. Specifically, the investigations presented here look at recreational ecosystem services, i.e., the nonmaterial benefits received from nature through physical and experiential interactions (Potschin & Haines-Young, 2016). In the past, various recreational ecosystem service valuation methodologies have been developed and applied to natural areas, however using them to evaluate urban green spaces, and specifically historic gardens, is a relatively unexplored research frontier with important implications in an increasingly urbanizing world.

It is often useful to look at historic garden management from the perspective of one representative city. Thus, their governance in the city of Palermo, Italy, is used when a case study is required. The historic gardens within the city of Palermo have been celebrated throughout history, and many of them still exist in some form today. However, they are also generally recognized as being quite degraded and many are not accessible to the public. Thus, the city of Palermo presents an ideal case study for identifying the crucial dysfunctionalities in the governance of these important natural and cultural heritage assets and in investigating ways to help them reach their recreational and tourism potential. In addition, Palermo is a good model for several internationally relevant issues, all very much intertwined with historic gardens, including the effects of economic and health crises on the management and visitation of green spaces, as well as those of public austerity, urbanization, and sustainable development initiatives, making the results of the studies contained here relevant internationally as well as locally.

This doctoral dissertation continues from this introduction to the research topic with the following chapters: 2) a presentation of the various research methodologies used; 3) a presentation of the case study area of Palermo (Italy) through a description of the city and through scoping interviews with various stakeholders; 4) a systematic review of the literature addressing historic garden management, with special attention regarding the social, economic and environmental aspects of sustainability; 5) an in depth look at the binding and non-binding policy determining historic garden governance, seen at different levels of jurisdiction and then evaluated in the case study city of Palermo in terms of the potential recreational ecosystem service supply, beneficiaries and demand; 6) an economic assessment of the recreational value created by an event in one of the most important historic gardens in the city of Palermo; 7) a concluding chapter offering an evaluation of this doctoral dissertation's results, implications, limits and proposals for some future research directions.

Chapter 1 References

Accati, E., & Devecchi, M. (2005). Il restauro del giardino storico. *Italus Hortus*, *12*(4), 17–30. http://www.italushortus.it/phocadownload/review/review_2/02.accati.pdf

Arena, G. (2015). I beni comuni nell'età della condivisione. In G. Arena & C. Iaione (Eds.), *L'età della condivisione. La collaborazione fra cittadini e amministrazione per i beni comuni* (pp. 15–30). Carocci.

Askwith, C. (2009). The economic contribution of historic parks, gardens and designed landscapes: A review of existing data and research and recommendations for future research. *Cultural Trends, 9:35, 27-79*. https://doi.org/10.1080/09548969909365088

Basnou, C., Pino, J., & Terradas, J. (2015). Ecosystem services provided by green infrastructure in the urban environment. *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*, *10*. https://doi.org/10.1079/PAVSNNR201510004

Benfield, R. (2021a). Events and festivals. In R. Benfield, *New directions in garden tourism* (pp. 98-115). CABI. https://doi.org/10.1079/9781789241761.0098

Benfield, R. (2021b). Impacts of botanic gardens: Economic, social, environmental, and health. In *New directions in garden tourism* (pp. 116–129). CABI. https://doi.org/10.1079/9781789241761.0008

Brandt, A., & Rohde, M. (2007). Sustainable marketing for historic gardens. *Garden History*, *35*(2), 131–145. https://www.jstor.org/stable/40219923

Catahan, N., & Woodruffe-Burton, H. (2019). The view, brew and loo: perceptions of botanic gardens? *Journal of Place Management and Development*, *12*(1), 20–38. https://doi.org/10.1108/JPMD-12-2017-0127

Cazzani, A., Zerbi, C. M., & Brumana, R. (2019). Management plans and Web-GIS software applications as active and dynamic tools to conserve and valorize historic public gardens. *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XLII-2/W15, 291–298. https://doi.org/10.5194/isprs-archives-XLII-2-W15-291-2019

Chadwick, G. F. (1966). *The park and the town public landscape in the 19th and 20th centuries* (F. A. Praeger, Ed.). Architectural Press.

Chan, K. M. A., Satterfield, T., & Goldstein, J. (2012). Rethinking ecosystem services to better address and navigate cultural values. *Ecological Economics*, *74*, 8–18. https://doi.org/10.1016/J.ECOLECON.2011.11.011

Codice dei beni culturali e del paesaggio, Decreto legislativo no. 42 and successive modifications. (2004). *Gazzetta Ufficiale della Repubblica Italiana* no. 45 del 24/02/2004, suppl. ordinario no. 28. https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2004-01-22;42

Collins, J. (2020). *The architecture and landscape of health: A historical perspective on therapeutic places 1790-1940*. Routledge.

Connell, J. (2005). Managing gardens for visitors in Great Britain: a story of continuity and change. *Tourism Management*, *26*(2), 185–201. https://doi.org/10.1016/j.tourman.2003.10.002

Conway, H. (2014). Public parks and their conservation. In M. Harney (Ed.), *Gardens and landscapes in historic building conservation* (pp. 193–205). Wiley Blackwell. https://doi.org/10.1002/9781118508107.CH19

Costituzione della Repubblica Italiana, art. 9 (1948). *Gazzetta Ufficiale della Repubblica Italiana* Serie Generale no. 298 del 27/12/1947. https://www.gazzettaufficiale.it/dettaglio/codici/costituzione

Cranz, G., & Boland, M. (2004). Defining the sustainable park: A fifth model for urban parks. *Landscape Journal*, *23*(2), 102–120.

European Landscape Convention (2000). European Treaty Series, no. 176. https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=0900001680080621

Funsten, C., Borsellino, V., & Schimmenti, E. (2020). A systematic literature review of historic garden management and its economic aspects. *Sustainability*, *12*(24). https://doi.org/10.3390/su122410679

Goetcheus, C., & Mitchell, N. (2014). The Venice charter and cultural landscapes: Evolution of heritage concepts and conservation over time. *Change Over Time*, *4*(2), 338–357. https://doi.org/10.1353/cot.2014.0018

Haines-Young, R., & Potschin, M. (2018). *Common International Classification of Ecosystem Services (CICES): V5.1 Guidance on the application of the revised structure*. www.cices.eu

ICOMOS-IFLA (1982). Historic Gardens (The Florence Charter). https://www.icomos.org/images/DOCUMENTS/Charters/gardens_e.pdf

Jellicoe, G., & Jellicoe, S. (1995). *The landscape of man: shaping the environment from prehistory to the present day* (3rd ed.). Thames and Hudson.

Jones, K. R. (2018). "The lungs of the city": Green space, public health and bodily metaphor in the landscape of urban park history. *Environment and History*, *24*(1), 39–58. https://doi.org/10.3197/096734018X15137949591837

Jordan, H. (1994). Public Parks, 1885-1914. *Garden History*, *22*(1), 85. https://doi.org/10.2307/1587004

Kadykalo, A. N., López-Rodriguez, M. D., Ainscough, J., Droste, N., Ryu, H., Ávila-Flores, G., Le Clec'h, S., Muñoz, M. C., Nilsson, L., Rana, S., Sarkar, P., Sevecke, K. J., & Harmáčková, Z. V. (2019). Disentangling 'ecosystem services' and 'nature's contributions to people.' *Ecosystems and People*, *15*(1), 269–287. https://doi.org/10.1080/26395916.2019.1669713

Lautenbach, S., Mupepele, A.-C., Dormann, C. F., Lee, H., Schmidt, S., Scholte, S. S. K., Seppelt, R., van Teeffelen, A. J. A., Verhagen, W., & Volk, M. (2019). Blind spots in ecosystem services research and challenges for implementation. *Regional Environmental Change*, *19*(8). https://doi.org/10.1007/s10113-018-1457-9

Legge Costituzionale 11 febbraio 2022, no. 1, "Modifiche agli articoli 9 e 41 della Costituzione in materia di tutela dell'ambiente" (2022). *Gazzetta Ufficiale della Repubblica Italiana* no.44 del 22-02-2022. https://www.normattiva.it/atto/caricaDettaglioAtto?atto.dataPubblicazioneGazzetta=2022-02-22&atto.codiceRedazionale=22G00019&atto.articolo.numero=1&atto.articolo.sottoArticolo=1&atto.articolo.tipoArticolo=0

Lourdes, K. T., Hamel, P., Gibbins, C. N., Sanusi, R., Azhar, B., & Lechner, A. M. (2022). Planning for green infrastructure using multiple urban ecosystem service models and multicriteria analysis. *Landscape and Urban Planning*, *226*, 104500. https://doi.org/10.1016/J.LANDURBPLAN.2022.104500

Lowenthal, D. (2015). *The past is a foreign country revisited*. Cambridge University Press.

MA (2005). *Ecosystems and human well-being: synthesis* (Millennium Ecosystem Assessment, Ed.). Island Press.

Mace, G. M. (2014). Whose conservation? *Science*, *345*(6204), 1558–1560. https://doi.org/10.1126/science.1254704

Milbourne, P. (2021). Growing public spaces in the city: Community gardening and the making of new urban environments of publicness. *Urban Studies*, *58*(14), 2901–2919. https://doi.org/10.1177/0042098020972281

Moser, S. (2023). The garden visitor experience. *Museum Management and Curatorship*, 1–17. https://doi.org/10.1080/09647775.2022.2158914

Neonato, F., Colaninno, B., & Tomasinelli, F. (2018). Green ecosystem services: TEV as tool to take decision for urban planning. *Economics and Policy of Energy and the Environment*, *2018*(2), 85–112. https://doi.org/10.3280/EFE2018-002005

Olsen, J. R., Nicholls, N., & Mitchell, R. (2019). Are urban landscapes associated with reported life satisfaction and inequalities in life satisfaction at the city level? A cross-sectional study of 66 European cities. *Social Science & Medicine*, *226*, 263–274. https://doi.org/10.1016/J.SOCSCIMED.2019.03.009

Paiva, P. D. De O., Sousa, R. De B., & Carcaud, N. (2020). Flowers and gardens on the context and tourism potential. *Ornamental Horticulture*, *26*(1), 121–133. https://doi.org/10.1590/2447-536x.v26i1.2144

Pinto, L. V., Inácio, M., Ferreira, C. S. S., Ferreira, A. D., & Pereira, P. (2022). Ecosystem services and well-being dimensions related to urban green spaces – A systematic review. *Sustainable Cities and Society*, *85*. https://doi.org/10.1016/J.SCS.2022.104072

Pirrone, G., Mauro, E., & Sessa, E. (1989). *"Palermo, detto paradiso di Sicilia" (Ville e Giardini, XII-XX secolo)* (Vol. 1). Centro Studi di Storia e Arte dei Giardini.

Potschin, M., & Haines-Young, R. (2016). Defining and measuring ecosystem services. In M. Potschin, R. Haines-Young, R. Fish, & R. K. Turner (Eds.), *Routledge Handbook of Ecosystem Services* (pp. 25–44). Routledge.

Rogers, E. B. (2001). *Landscape design, a cultural and architectural history* (J. Moore & R. A. Gallin, Eds.). Harry N. Abrams, Inc.

Rostami, R., Lamit, H., Khoshnava, S., Rostami, R., & Rosley, M. (2015). Sustainable cities and the contribution of historical urban green spaces: A case study of historical Persian gardens. *Sustainability*, *7*(10), 13290–13316. https://doi.org/10.3390/su71013290

Tempesta, T. (2016). Benefits and costs of urban parks: A review. *Aestimum*, 67, 127–143. https://doi.org/10.13128/AESTIMUM-17943

Tempesta, T. (2018b). Degradation of the Palladian landscape. *Aestimum*, 72, 109–130. https://doi.org/10.13128/AESTIMUM-23971

UNESCO (2021). The operational guidelines for the implementation of the World Heritage Convention (WHC.21/01). https://whc.unesco.org/en/guidelines/

United Nations (2015a). *United Nations Sustainable Development Goals - 11 Sustainable cities and communities - Goal 11 targets*. United Nations Sustainable Development Goals. https://www.un.org/sustainabledevelopment/cities/

Valente, D., Pasimeni, M. R., & Petrosillo, I. (2020). The role of green infrastructures in Italian cities by linking natural and social capital. *Ecological Indicators*, *108*. https://doi.org/10.1016/J.ECOLIND.2019.105694

Venturi Ferriolo, M. (1989). *Nel grembo della vita: Le origini dell'idea di giardino*. Guerini e associati.

Ward Thompson, C., Roe, J., Aspinall, P., Mitchell, R., Clow, A., & Miller, D. (2012). More green space is linked to less stress in deprived communities: Evidence from salivary cortisol patterns. *Landscape and Urban Planning*, *105*(3), 221–229. https://doi.org/10.1016/J.LANDURBPLAN.2011.12.015

WHO Regional Office for Europe (2017a). *Urban green spaces: a brief for action*. https://www.euro.who.int/__data/assets/pdf_file/0010/342289/Urban-Green-Spaces_EN_WHO_web3.pdf

WHO Regional Office for Europe (2017b). *Urban green space and health: Intervention impacts and effectiveness*. https://www.euro.who.int/__data/assets/pdf_file/0007/338074/full-report-for-archiving.pdf

Wolch, J. R., Byrne, J., & Newell, J. P. (2014). Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough.' *Landscape and Urban Planning*, *125*, 234–244. https://doi.org/10.1016/J.LANDURBPLAN.2014.01.017

World Heritage Convention (1972). UNESCO *Convention concerning the protection of the world cultural and natural heritage*. https://whc.unesco.org/archive/convention-en.pdf

Chapter 2 - Research and Analysis Methodologies

2.1 Introduction

This dissertation explores several different research methodologies that have to do with the study of human beings and their relationship with their environment by applying them to investigations concerning historic garden management. The focus of these investigations is on people and their social, political and economic systems.

The following seven key phases are universal to the presented research methodologies: 1) conducting a literature review on the phenomena of interest and relative theoretical ideas; 2) identifying the concept and theories that drive the research process and explain the findings; 3) identifying the specific research questions that the study should answer; 4) sampling cases, i.e. selecting the research subjects to be studied; 5) data collection; 6) data analysis; 7) writing up the research for dissemination (Bryman, 2016). Each of these methodologies employs specific methods for its various phases, especially regarding data collection and analysis (Howell, 2013), in order to assure that standards of reliability, replication and validity are met.

This dissertation begins by concentrating on qualitative methods, continuing to spatial ones and finally concluding with quantitative methods. However, several chapters take a mixed-methods approach. The following section presents a brief overview of each method, describes where it is used and justifies its implementation.

2.2 Survey and Interview Methods

Survey and interview methods involve collecting data from real people out in the world rather than from inanimate or vegetal subjects in a laboratory or test field. This kind of research is inherently "messy": research subjects may or may not collaborate and the context in which they are being studied might change unexpectedly (Bryman, 2016; Groves et al., 2004). This facet of these social research methods has been made even more evident during the COVID-19 global pandemic (Nind et al., 2021).

Also, working with human subjects entails certain ethical obligations which can be summed up by the principles of:

1) Beneficence - where researchers must minimize possible harms and maximize possible benefits for the participants, and which includes protecting participant confidentiality and privacy;
2) Justice - where there is an equitable balance between those who bear the burdens of research and those who benefit from it;
3) Respect for persons - which includes obtaining the knowing consent of participants or their legally authorized representative, without indue inducement, constraint or coercion (Groves et al., 2004).

These ethical obligations are generally satisfied in non-invasive and non-sensitive research projects by providing participants with appropriate information about the research study in question, their rights and on how their privacy will be protected, and then formally obtaining their informed consent.

Data is collected from human subjects in two different ways within this dissertation: through interviews and through survey questionnaires. The information collected and analyzed by the interviews is mainly qualitative while the information collected with the survey questionnaires is quantitative. The analysis of the quantitative data collected with survey questionnaires is discussed below in a separate section on environmental valuation.

Interviews involve the interviewer(s), the interview participant(s), an interview program, and the context. Each one of these elements can affect the data gathered and must be considered in

research project designs. Establishing a clear interview program helps standardize the process and eliminate inconsistency and error.

In a structured interview, the program is very clearly defined with a pre-written list of questions. This helps the interviewer collect standardized data in a replicable way. Well-formulated questions help assure data validity.

There are four main cognitive processes involved when participants answer questions:

1) Comprehension – the participant interprets the question;
2) Retrieval – the participant recalls the information needed to answer;
3) Judgement – the participant combines, summarizes, or completes recalled information to adapt it to the question;
4) Reporting – the participant formulates a response in the required format (Groves et al., 2004).

Problems may arise at each one of these stages: during the comprehension phase, participants may misinterpret the question or fail to follow instructions; during the retrieval phase they may have problems remembering the information requested; during the judgement phase, they may distort their answer due to flawed perceptions or estimations; during the reporting phase, their answers might be changed by conscious or unconscious factors. Interviewers must do their best to design their program to minimize these pitfalls (Groves et al., 2004). Structured interviews are sometimes recorded and sometimes not. In the second case, interviewers often fill out their structured interview program to record participant responses.

Unstructured interviews are more flexible because they are meant to seek out the worldview of research participants rather than ascertain facts (Bryman, 2016). They may be conducted as a desk interview, in an unstimulating environment that does not influence the participants' responses, or as a walking interview, where the environment purposefully stimulates the participants' response. The walking interview is a phenomenological qualitative research method where the interviewer and participant are "moving, interacting, experiencing beings" located in a spatial context (O'Neill & Roberts, 2019). It is particularly useful for investigating people's understanding of place (Evans & Jones, 2011). Both forms of unstructured interviews require a program to standardize how different interviews are carried out and to help the interviewer deal with unforeseen contingencies. Because there are more nuances within participant responses, these kinds of interviews are generally recorded for transcription.

Structured and unstructured desk and walking interviews are presented in chapter three in the section titled "Scoping Interviews with Historic Garden Stakeholders in Palermo". These methods were chosen to help the researcher understand the important issues regarding historic garden management from the point of view of garden managers and caretakers themselves. This helped identify key issues that are explored with other methodologies in later research stages.

2.3 The Systematic Literature Review

The literature review is a fundamental step in any scholarly investigation, providing background information and justifying continued study. The systematic review distinguishes itself from the traditional narrative review by its exhaustiveness and use of explicit procedures to synthesize a body of literature (Bryman, 2016). It is particularly useful for tracing inter- and transdisciplinary themes in scientific discourse, or for providing advice to decision-makers based on all available evidence. Conducting a systematic literature review has also been observed to be particularly rewarding for early-career researchers, including PhD candidates, because it allows them to produce a structured quantitative summary of their chosen field (Pickering & Byrne, 2014). One of the most common protocols for conducting a systematic

review is that of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The PRISMA protocol was established in 2009 with medical research in mind, to address inconsistency and quality problems observed in the medical research used to determine clinical practice guidelines (Moher et al., 2009).

The full PRISMA protocol includes a 27-item checklist addressing the sections of a systematic review report, however the process can be summarized in five basic steps:

1) Define the scope and purpose of the review;
2) Seek out studies relevant to the scope and purpose of the review;
3) Assess the relevance of each study for the research question(s);
4) Appraise the studies from step three;
5) Analyze each study and synthesize the results (Bryman, 2016).

Step one regards formulating clear research aims and objectives; step two regards deciding what search methods to employ, usually in terms of scientific literature indexes and keyword queries; steps three and four entail defining and applying clear eligibility standards; and step five involves defining and carrying out a formal analysis protocol, which may be quantitative or qualitative in nature. This is an iterative process, and researchers are expected to change their search and eligibility requirements so that they select the best body of research to respond to their research question(s) (Moher et al., 2009).

The systematic research review is presented in this dissertation in chapter four, "A Systematic Literature Review of Historic Garden Management and its Economic Aspects", following the PRISMA protocol presented in Moher et al. (2009).

2.4 Content Analysis

Content analysis is a flexible research method that can be carried out in a quantitative or qualitative manner. Bryman (2016) defines content analysis as "an approach to the analysis of documents and texts that seeks to quantify content in terms of predetermined categories and in a systematic and replicable manner". Thus, content analysis differs from intuitive personal interpretation because it involves a systematic application of categorization rules, thereby assuring that the results obtained are as neutral (the rules may be influenced by the personal interests and concerns of the researcher, but the results are not), and replicable (the application of the same rules by another researcher should produce the same results) as possible (Bryman, 2016).

Quantitative content analysis uses predetermined coding rules to produce countable data. It follows the general procedure of:

1) Determining clear research questions that can be answered by counting instances;
2) Selecting a sample, which is often formulated in terms of the representation of *X* in *Y*;
3) Determining the time frame for sampling;
4) Deciding what instances are to be counted in each sampled case, e.g., significant actors, word frequency, manifest subjects, themes, goals, or dispositions;
5) Devising a coding schedule and coding manual, i.e., a standard form in which data will be entered and unequivocal instructions for coders, including all possible categories for each dimension being coded and how each one should be attributed so that there is no overlap. Explanations as to how categories are determined should also be provided (Bryman, 2016).

Qualitative, or ethnographic, content analysis differs in practice from quantitative content analysis because it allows the researcher to draw out the themes and categories in a more inductive and iterative way and puts more emphasis on the context in which documents are

generated (Bryman, 2016). Qualitative content analysis is used to search for themes rather than amounts in documents and can also be used to identify latent information (Bryman, 2016). Altheide and Schneider (2013 in Bryman, 2016) provide a good list of the steps required in a qualitative content analysis:

1) Generate a research question;
2) Become familiar with the context within which the documents were/are generated;
3) Become familiar with a small number of documents (6-10) and consider what the unit of analysis is;
4) Generate some categories that will guide the collection of data and draft a protocol for collecting the data in terms of the generated categories – the protocol is very similar to the kind of instrument (coding schedule) used to conduct a quantitative content analysis;
5) Test the protocol by using it for the collecting of data from a number of documents;
6) Revise the protocol and select further cases to sharpen it up;
7) Establish the sampling strategy;
8) Collect data, which means filling the empty spaces in the protocol for the item under consideration;
9) Conduct data analysis, which includes refining and developing categories;
10) Make notes about extreme cases or differences between cases;
11) Combine the summaries of cases, drawing attention to extremes and typical cases;
12) Bring together findings and interpretation in the writing up.

Quantitative content analysis is used in the systematic review presented in chapter four to categorize the existing literature on historic garden management and describe the field numerically. Qualitative content analysis is used in chapter five, "The Political Governance of Historic Gardens", in the sections "International Policy Relevant to Historic Garden Management" and "The Appropriate Legal and Administrative Measures: The Florence Charters and Legislation Governing the Identification, Listing and Protection of Historic Gardens in Palermo, Sicily", to draw out recurring themes in historic garden policy, understand the wider context producing specific policy initiatives and make comparisons.

2.5 Spatial Analysis

Spatial analysis investigates phenomena in terms of "what happens where" by using geographically referenced information. The growing popularity of spatial research is partially due to Geographic Information System (GIS) technologies that have been developing since the mid-20th century and their particular ability to serve as decision support tools (Longley et al., 2015).

These GIS technologies translate concepts of place into computer representations of space (Couclelis, 2009). The English word "place" can have different meanings and functions in different languages and cultures (Blaschke et al., 2018). Space, on the other hand, is an abstract and objective concept that lends itself to quantifiable data (Tuan, 1979) that can be analyzed with mathematics and represented by a computer in points, lines and polygons (Blaschke et al., 2018). Often scientists don't fully consider how they interpret place into space, but instead automatically use conventions related to their own culture's metaphysical, ontological and epistemological worldview (Raper, 1999). In this way, they may have a false impression that their conclusions are fact, when they are actually conceptual representations. Ideas and methods from the normative and synthetic sciences of planning, engineering and design can help improve spatial reasoning because the mental processes involved are overtly goal-

oriented, prescriptive and normative (Couclelis, 2009). In other words, they explicitly interpret space into place according to stated design goals.

Applying this problem-solving research mentality to spatial analysis requires some special considerations. With this in mind De Smith et al., (2018) propose an iterative research model identified with the acronym, PPDAC, and carried out in the following steps:

1. Problem – the research problem is formulated. Spatial analysis is often used to investigate the spatial patterns of data sets or to forecast the future of certain geographic areas. It is also often part of multi-disciplinary modeling processes that are applied to management or planning problems such as: ecosystem service modelling (Hamel et al., 2021; Lourdes et al., 2022; Wen et al., 2022); econometric modeling of production areas (Ievoli et al., 2017); risk modelling (Kalogirou & Chalkias, 2014); landscape change modelling (Aldwaik & Pontius, 2012; Li et al., 2019; Wales et al., 2020); geodemographic or equity modelling (Grove et al., 2014; Nesbitt et al., 2019). Feasibility is an important issue at this stage. A preliminary study of the available data should be conducted to ascertain whether quality data exists to respond to the research question.
2. Plan – the approach is programmed. This step involves defining a project plan that specifies tasks, resources, time frames, operational needs and conditions and estimated costs of necessary data, hardware, software, manpower or services. Feasibility is also important at this stage;
3. Data acquisition – research data is often acquired from third parties rather than being elaborated by the researcher. Researchers need to be particularly careful of spatial data homogeneity in terms of scale, format, encoding, coverage and quality. Acquired data is often not fit for use as received, and researchers must spend significant time on data cleaning. Any integrations and adaptations must be performed in a scientific and explicitly justified way;
4. Analysis – spatial analysis methods and tools range in complexity from visual spatial pattern identification to spatial statistical or econometric analyses, to model building. Analysis tools should be selected in the problem phase according to principles of simplicity, parsimony, and appropriateness. Time, cost and capacity constraints often also play a role in model selection;
5. Conclusions – results are delivered and disseminated. In a research context, this phase is the same as for other forms of scientific enquiry. However, spatial analysis is often performed for practical purposes or as part of a participatory planning initiative. In this case, communicating the results should take the intended audience in mind (De Smith et al., 2018).

Spatial analysis is carried out in chapter five, “The Political Governance of Historic Gardens”, in the section, “An Infinity of Lists: A Spatial Analysis of the International, National, Regional, and Municipal Registers of Protected Historic Gardens in Force in Palermo, Sicily”. It was chosen for its ability to translate the abstract concepts presented in policy into visible and quantifiable spatial relationships. Some spatial analysis is also performed in chapter six, “The Recreational Value of Botanic Garden Events: A Case Study of the Zagara Plant Fair in Palermo, Italy”. In this case, it is part of the data elaboration process supporting an economic valuation of recreational ecosystem services.

2.6 Environmental Valuation

Environmental valuation regards assigning monetary values to environmental goods or services and assesses the economic impacts of environmental changes. The theoretical foundations of

environmental valuation are rooted in the field of economics and are based on principles of the market, efficiency and welfare. Its end purpose is not to define worth, but instead to provide decision-makers with the necessary information and tools to efficiently allocate resources and design policy to maximize social welfare (Guijarro & Tsinaslanidis, 2020; Turner et al., 1993). Environmental evaluation is often used in the cost-benefit analysis of projects or policies that are expected to affect human welfare (Atkinson & Mourato, 2015). Cost benefit analysis is a decision-making tool to evaluate and choose between different policy or project options, which might include a possible action and no action, or evaluating different possible actions with various trade-offs.

More specifically, a special set of methods are needed to evaluate environmental assets because they are non-rival (not used up as they are consumed) or non-exclusive (exclusive fruition is not guaranteed by property rights) (Figure 1). This means that they cannot be bought and sold in the same way as private goods, and thus the market cannot determine their price and efficiently regulate their production and consumption (Perloff, 2018).

Figure 1 – Goods Categorized by Rivalry and Exclusivity

	Absolute rivalry	**No rivalry**
Absolute exclusivity	**Private goods** Those that are normally bought and sold (Bread, pencils, computers, cars)	**Club goods** Those where there is some barrier to entry such as a monetary fee or a physical limit (Pay-to enter museums, swimming pools and gardens)
No exclusivity	**Common goods** Those where everyone has access to exploit a limited resource (Wild foods such as foraged plants and mushrooms or fish and game; public pasture; irrigation water)	**Pure public goods** Those that are freely accessible to all, with no limits on consumption (Air, the landscape, freely accessible recreational areas)

Figure adopted from Tempesta (2018a) and Perloff (2018).

Historic gardens are pure public goods if they are freely open to all or club goods if there is an entry ticket or a limit on the number of visitors to reduce crowding (Benfield, 2001).

Furthermore, the market also fails to efficiently regulate the costs and benefits of these public and semipublic goods because positive and negative externalities are created during their production and consumption. An example of a negative externality is pollution caused by production; an example of a positive externality is the conservation of the landscape by the primary sector (Tempesta, 2018a). Because the market fails to regulate externalities efficiently, government intervention is often necessary to regulate social welfare (Atkinson & Mourato, 2015; Perloff, 2018). Government intervention can entail clarifying property rights so that they include externalities or paying for the costs of externalities directly. Limiting the ways heritage owners can use their properties is an example of the former; government funding for heritage conservation and promotion is an example of the later (Towse, 2019).

The concept of total economic value (TEV) was introduced in the 1980s (Turner et al., 1993) to correct the market's failure to account for the full value of environmental resources by

distinguishing between user values and intrinsic (non-user) values and to account for both development benefits and conservation benefits (Turner et al., 1993). Today, TEV is also applied to cultural and landscape heritage (Tempesta, 2018a; Towse, 2019).

Visiting a historic garden is a non-extractive experiential use (Figure 2). More specifically, it is a recreational use.

Figure 2 - Components of Total Economic Value

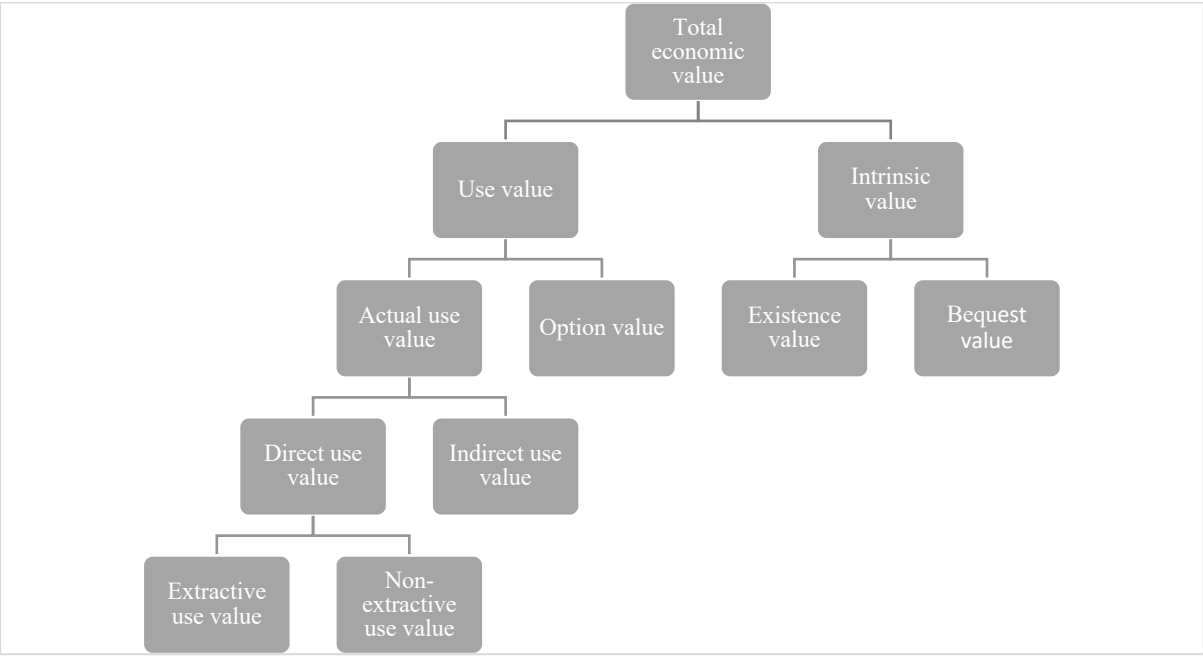
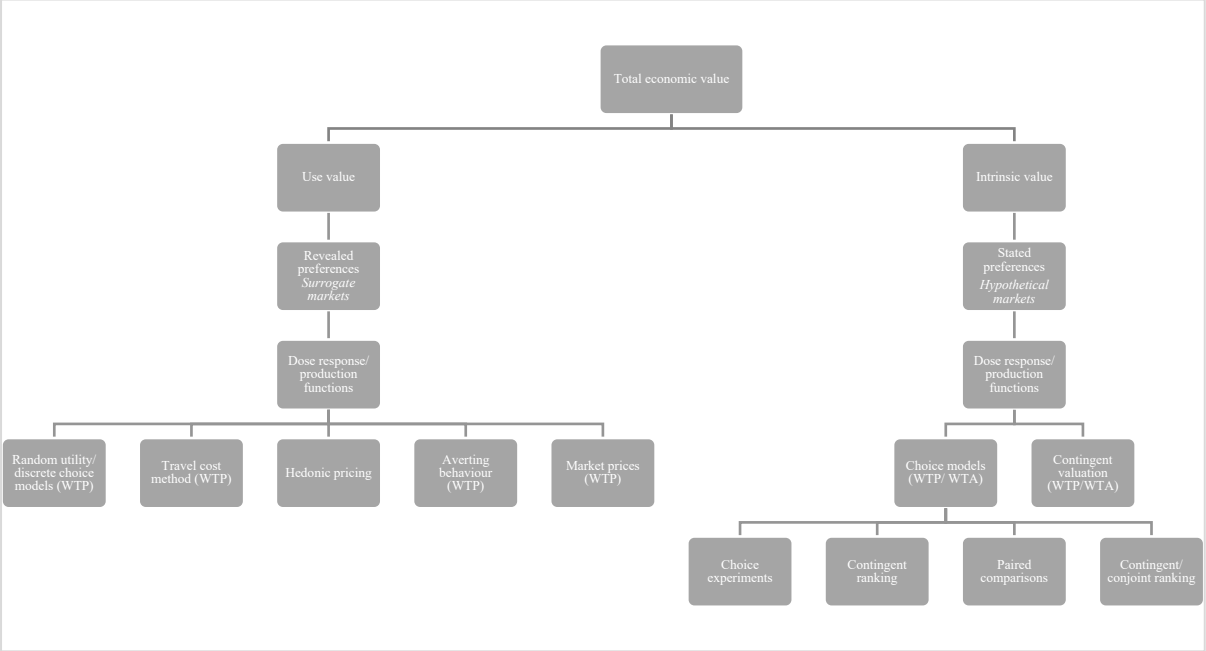


Figure adopted from Tempesta (2018a) and Pearce et al., (2006).

There are various methods used to assign a value to the TEV of an unpriced good, or one of its components (Figure 3). Surrogate or hypothetical markets are used to assess the expressed or revealed preferences of people's willingness to pay (WTP) for it, or their willingness to accept payment (WTA) in exchange for it (Pearce et al., 2006). People express WTP and WTA for both positive externalities, such as the benefits received from visiting a historic garden, and negative externalities, such as damage to the aesthetic quality of the landscape caused by industrial development (Pearce et al., 2006). When the impact on the collective wellbeing of society is being measured, the reference population for the TEV is the entire affected population, and the estimated value is called the social value (Turner et al., 1993).

Figure 3 - Valuation Methods Used to Estimate TEV



Elaborated from Pearce et al., (2006). All these methods can be the foundation of a benefit transfer estimate.

Few economic assessments of historic gardens exist in the literature (Askwith, 2009). However, TEV methods have been applied to a number of related subjects that can usefully inform historic garden assessments. Some examples of applications in the Italian valuate the landscape (Tempesta, 2014; Tempesta et al., 2014; Torquati et al., 2015), protected natural parks (Asciuto et al., 2004), urban parks and gardens (Marone et al., 2010; Neonato et al., 2018; Tempesta, 2016), historic estates (Tempesta, 2018b), and monumental trees (Asciuto et al., 2015). Furthermore, there is a small body of international literature regarding botanic gardens (Affandi et al., 2020; Demir, 2014; Garrod et al., 1993; Mwebaze & Bennett, 2012).

Another way to quantify the value of the environment is through the ecosystem service conceptual framework. Ecosystem services regard the contributions ecosystems make to human well-being (Haines-Young & Potschin, 2018). The term ecosystem service was first introduced by Ehrlich and Ehrlich (1981) to encourage public interest in the social benefits of ecosystem conservation (Di Franco et al., 2021). The most current ecosystem service framework is the Common International Classification of Ecosystem Services (CICES), which seeks to standardize and operationalize the definitions first provided by the Millennial Ecosystem Assessment (MA, 2005) and The Economics of Ecosystems and Biodiversity (TEEB, 2010). Ecosystem service valuations can be made in monetary and in non-monetary terms. They distinguish themselves from TEV valuations because: they value ecosystems as a multifunctional product where products and services are independent of one another; they focus on marginal and discrete changes rather than on a total value; they are geographically defined and thus establish property right regimes for valuated resources; they distinguish between actual and potential economic value (Pearce et al., 2006). As mentioned above, spatial analysis is often a component of ecosystem service valuation and is recently being applied to TEV analyses as well (Bernetti et al., 2013).

The current CICES framework uses a cascade model in which supporting services lead to final services which then produce goods and benefits (Potschin & Haines-Young, 2016). The three final services are: provisioning services; regulation and maintenance services; cultural services. Cultural services differ from the other two because their benefits come exclusively from

human-ecosystem relationships. They are equated with the environmental settings that give rise to changes in people's physical or mental states while their benefits are understood as the experiences or capabilities gained from those settings (Potschin & Haines-Young, 2016). Cultural ecosystem services are among the most studied category of ecosystem services, with recreational ecosystem services being the most evaluated subcategory (Hermes et al., 2018; Schirpke et al., 2018).

The travel cost method (TCM) is one well-established way to economically assess both recreational value and recreational ecosystem services (Mayer & Woltering, 2018). It is a non-market, revealed-choice valuation technique that was first elaborated to estimate the recreational benefits of American National Parks in the mid-20th century (Clawson & Knetsch, 1966). There are three established variations of the TCM: individual TCM, zonal TCM and alternative site TCM (Sinclair et al., 2020). Individual TCM correlates an individual visitor's number of trips to a site or amenity in a defined period to the costs they sustain to create a demand function used to estimate consumer surplus. The zonal TCM does this by dividing visitors into zones according to the distance that visitors travel and correlates the frequency rate of visitors from each zone to cost. In alternative site TCM, random utility models produce a demand curve from a set of best alternatives (Tempesta, 2018a). Traditionally, TCM studies have mostly relied on survey questionnaires to collect their data. However, the increasing availability of crowd-sourced data has provided a less costly alternative source (Sinclair et al., 2020).

This dissertation performs a non-monetary valuation of potential recreational ecosystem service demand in chapter five, in the section, "An Infinity of Lists: A Spatial Analysis of the International, National, Regional, and Municipal Registers of Protected Historic Gardens in Force in Palermo, Sicily". A monetary valuation of recreational ecosystem service benefits is carried out in chapter six, "The Recreational Value of Botanic Garden Events: A Case Study of the Zagara Plant Fair in Palermo, Italy". The former uses crowd-sourced data to compare the potential users targeted by policy measures to the real demand for historic garden recreation in Palermo. It is followed with an up-close investigation of a single site carried out through survey questionnaires and the zonal TCM.

Chapter 2 References

Affandi, S. D., Halimatussadiah, A., & Asrofani, F. W. (2020). Visitors' preferences on the characteristics of Bogor Botanical Gardens. *Sustainability*, *12*(22). https://doi.org/10.3390/su12229489

Aldwaik, S. Z., & Pontius, R. G. (2012). Intensity analysis to unify measurements of size and stationarity of land changes by interval, category, and transition. *Landscape and Urban Planning*, *106*(1), 103–114. https://doi.org/10.1016/J.LANDURBPLAN.2012.02.010

Asciuto, A., Borsellino, V., D'Acquisto, M., Di Franco, C. P., di Gesaro, M., & Schimmenti, E. (2015). Monumental trees and their existence value: the case study of an Italian natural park. *Journal of Forest Science*, *61*(2), 55–61. https://doi.org/10.17221/86/2014-JFS

Asciuto, A., Fiandaca, F., & Schimmenti, E. (2004). Stima della disponibilità a pagare per la salvaguardia di un'area protetta siciliana dagli incendi boschivi. *Aestimum*. https://doi.org/10.13128/AESTIMUM-6624

Askwith, C. (2009). The economic contribution of historic parks, gardens and designed landscapes: A review of existing data and research and recommendations for future research. *Cultural Trends, 9:35, 27-79*. https://doi.org/10.1080/09548969909365088

Atkinson, G., & Mourato, S. (2015). *Cost-benefit analysis and the environment* (No. 97; OECD Environment Working Papers). https://doi.org/10.1787/5jrp6w76tstg-en

Benfield, R. (2001). "Good things come to those who wait": Sustainable tourism and timed entry at Sissinghurst Castle Garden, Kent. *Tourism Geographies*, *3*(2), 207–217. https://doi.org/10.1080/14616680010030275

Bernetti, I., Sottini, V. A., Marinelli, N., Marone, E., Menghini, S., Riccioli, F., Sacchelli, S., & Marinelli, A. (2013). Quantification of the total economic value of forest systems: Spatial analysis application to the region of Tuscany (Italy). *Aestimum*, 29–65. https://doi.org/10.13128/AESTIMUM-13191

Blaschke, T., Merschdorf, H., Cabrera-Barona, P., Gao, S., Papadakis, E., & Kovacs-Györi, A. (2018). Place versus space: From points, lines and polygons in GIS to place-based representations reflecting language and culture. *ISPRS International Journal of Geo-Information 2018, Vol. 7, Page 452*, *7*(11), 452. https://doi.org/10.3390/IJGI7110452

Bryman, A. (2016). *Social research methods* (5th Edition). Oxford University Press.

Clawson, M., & Knetsch, J. L. (1966). *Economics of outdoor recreation*. John Hopkins Press for Resources for the Future.

Couclelis, H. (2009). The abduction of geographic information science: Transporting spatial reasoning to the realm of purpose and design. In *Lecture notes in computer science (including subseries lecture notes in artificial intelligence and lecture notes in Bioinformatics): Vol. 5756 LNCS* (pp. 342–356). Springer. https://doi.org/10.1007/978-3-642-03832-7_21

De Smith, M. J., Goodchild, M. F., & Longley, P. Al. (2018). *Geospatial analysis: A comprehensive guide to principles, techniques and software tools* (6th ed.). Winchelsea Press.

Demir, A. (2014). Determination of the recreational value of botanic gardens. A case study Royal Botanic Gardens, Kew, London. *Revista de Cercetare Si Interventie Sociala*, *44*, 160–180.

Di Franco, C. P., Lima, G., Schimmenti, E., & Asciuto, A. (2021). Methodological approaches to the valuation of forest ecosystem services: An overview of recent international research trends. *Journal of Forest Science*, *67*(7), 307–317. https://doi.org/10.17221/13/2021-JFS

Ehrlich, P. R., & Ehrlich, A. H. (1981). *Extinction: The causes and consequences of the disappearance of species*. Random House.

Evans, J., & Jones, P. (2011). The walking interview: Methodology, mobility and place. *Applied Geography*, *31*(2), 849–858. https://doi.org/10.1016/j.apgeog.2010.09.005

Garrod, G., Pickering, A., & Willis, K. (1993). The economic value of botanic gardens: A recreational perspective. *Geoforum*, *24*(2), 215–224. https://doi.org/10.1016/0016-7185(93)90035-G

Grove, J. M., Locke, D. H., & O'Neil-Dunne, J. P. M. (2014). An ecology of prestige in New York city: Examining the relationships among population density, socio-economic status, group identity, and residential canopy cover. *Environmental Management*, *54*(3), 402–419. https://doi.org/10.1007/s00267-014-0310-2

Groves, R. M., Flowler, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2004). *Survey Methodology* (R. M. Groves, G. Kalton, J. N. K. Rao, N. Schwarz, & C. Skinner, Eds.). John Wiley & Sons.

Guijarro, F., & Tsinaslanidis, P. (2020). Analysis of academic literature on environmental valuation. *International Journal of Environmental Research and Public Health*, *17*(7), 2386. https://doi.org/10.3390/ijerph17072386

Haines-Young, R., & Potschin, M. (2018). *Common International Classification of Ecosystem Services (CICES): V5.1 Guidance on the application of the revised structure*. www.cices.eu

Hamel, P., Guerry, A. D., Polasky, S., Han, B., Douglass, J. A., Hamann, M., Janke, B., Kuiper, J. J., Levrel, H., Liu, H., Lonsdorf, E., McDonald, R. I., Nootenboom, C., Ouyang, Z., Remme, R. P., Sharp, R. P., Tardieu, L., Viguié, V., Xu, D., Zheng, H. & Daily, G. C. (2021). Mapping the benefits of nature in cities with the InVEST software. *Npj Urban Sustainability*, *1*(1), 1–9. https://doi.org/10.1038/s42949-021-00027-9

Hermes, J., van Berkel, D., Burkhard, B., Plieninger, T., Fagerholm, N., von Haaren, C., & Albert, C. (2018). Assessment and valuation of recreational ecosystem services of landscapes. *Ecosystem Services*, *31*, 289–295. https://doi.org/10.1016/J.ECOSER.2018.04.011

Howell, K. (2013). *An introduction to the philosophy of methodology*. SAGE Publications Ltd. https://doi.org/10.4135/9781473957633

Ievoli, C., Basile, R. G., & Belliggiano, A. (2017). The spatial patterns of dairy farming in Molise. *European Countryside*, *9*(4), 729–745. https://doi.org/10.1515/EUCO-2017-0041

Kalogirou, S., & Chalkias, C. (2014). Mapping environmental risks: Quantitative and spatial modeling approaches. *Journal of Maps,* 10:2, 183-185. https://doi.org/10.1080/17445647.2014.890135

Li, S., Bing, Z., & Jin, G. (2019). Spatially explicit mapping of soil conservation service in monetary units due to land use/cover change for the Three Gorges reservoir area, China. *Remote Sensing*, *11*(4), 468. https://doi.org/10.3390/rs11040468

Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic information science and systems,* (4th ed.). Wiley. https://www.wiley.com/en-gb/Geographic+Information+Science+and+Systems%2C+4th+Edition-p-9781119031307

Lourdes, K. T., Hamel, P., Gibbins, C. N., Sanusi, R., Azhar, B., & Lechner, A. M. (2022). Planning for green infrastructure using multiple urban ecosystem service models and multicriteria analysis. *Landscape and Urban Planning*, *226*, 104500. https://doi.org/10.1016/J.LANDURBPLAN.2022.104500

MA. (2005). *Ecosystems and human well-being: synthesis* (Millennium Ecosystem Assessment, Ed.). Island Press.

Marone, E., Riccioli, F., Scozzafava, G., & Fratini, R. (2010). Il valore d'uso delle aree verdi: La stima dell'universo dei fruitori di alcuni parchi urbani fiorentini. *Aestimum*, *57*, 143–169. https://doi.org/10.13128/AESTIMUM-9096

Mayer, M., & Woltering, M. (2018). Assessing and valuing the recreational ecosystem services of Germany's national parks using travel cost models. *Ecosystem Services*, *31*, 371–386. https://doi.org/10.1016/J.ECOSER.2017.12.009

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., The Prisma Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA Statement. *PLOS Medicine*, *6*(7), e1000097. https://doi.org/10.1371/JOURNAL.PMED.1000097

Mwebaze, P., & Bennett, J. (2012). Valuing Australian botanic collections: A combined travel-cost and contingent valuation study. *Australian Journal of Agricultural and Resource Economics*, *56*(4). https://doi.org/10.1111/j.1467-8489.2012.00595.x

Neonato, F., Colaninno, B., & Tomasinelli, F. (2018). Green ecosystem services: TEV as tool to take decision for urban planning. *Economics and Policy of Energy and the Environment*, *2018*(2), 85–112. https://doi.org/10.3280/EFE2018-002005

Nesbitt, L., Meitner, M. J., Girling, C., Sheppard, S. R. J., & Lu, Y. (2019). Who has access to urban vegetation? A spatial analysis of distributional green equity in 10 US cities. *Landscape and Urban Planning*, *181*, 51–79. https://doi.org/10.1016/j.landurbplan.2018.08.007

Nind, M., Coverdale, A., & Meckin, R. (2021). *Changing social research practices in the context of COVID-19: Rapid evidence review*. National Centre for Research Methods. https://eprints.ncrm.ac.uk/id/eprint/4458/

O'Neill, M., & Roberts, B. (2019). *Walking methods: Research on the move*. Routledge.

Pearce, D., Atkinson, G., & Mourato, S. (2006). Cost-benefit analysis and the environment: Recent developments. Organisation for Economic Cooperation and Development (OECD). https://doi.org/10.1787/9789264010055-EN

Perloff, J. M. (2018). *Microeconomics - Global edition* (8th ed.). Pearson.

Pickering, C., & Byrne, J. (2014). The benefits of publishing systematic quantitative literature reviews for PhD candidates and other early-career researchers. *Higher Education Research & Development (HERD)*, *33*(3), 534–548. https://doi.org/10.1080/07294360.2013.841651

Potschin, M., & Haines-Young, R. (2016). Defining and measuring ecosystem services. In M. Potschin, R. Haines-Young, R. Fish, & R. K. Turner (Eds.), *Routledge Handbook of Ecosystem Services* (pp. 25–44). Routledge.

Raper, J. (1999). Spatial representation: The scientist´s perspective. In Longely P.A., Goodchild M.F., Maquire D.J., & Rhind D..W (Eds.), *Geographical Information Systems: Principles and technical issues* (2nd ed., pp. 61–70). Wiley.

Schirpke, U., Scolozzi, R., da Re, R., Masiero, M., Pellegrino, D., & Marino, D. (2018). Recreational ecosystem services in protected areas: A survey of visitors to Natura 2000 sites in Italy. *Journal of Outdoor Recreation and Tourism*, *21*, 39–50. https://doi.org/10.1016/J.JORT.2018.01.003

Sinclair, M., Mayer, M., Woltering, M., & Ghermandi, A. (2020). Valuing nature-based recreation using a crowdsourced travel cost method: A comparison to onsite survey data and value transfer. *Ecosystem Services*, *45*, 101165. https://doi.org/10.1016/J.ECOSER.2020.101165

TEEB (2010). Integrating the ecological and economic dimensions in biodiversity and ecosystem service valuation. In P. Kumar (Ed.), *The economics of ecosystems and biodiversity: The ecological and economic foundations* (pp. 3-40). Earthscan. http://www.teebweb.org/wp-content/uploads/2013/04/D0-Chapter-1-Integrating-the-ecological-and-economic-dimensions-in-biodiversity-and-ecosystem-service-valuation.pdf

Tempesta, T. (2014). People's preferences and landscape evaluation in Italy: A review. *New Medit*, *1*, 10.

Tempesta, T. (2016). Benefits and costs of urban parks: A review. *Aestimum*, 67, 127–143. https://doi.org/10.13128/AESTIMUM-17943

Tempesta, T. (2018a). *Estimo ambientale*. CLEUP sc.

Tempesta, T. (2018b). Degradation of the Palladian landscape. *Aestimum*, 72, 109–130. https://doi.org/10.13128/AESTIMUM-23971

Tempesta, T., Vecchiato, D., & Girardi, P. (2014). The landscape benefits of the burial of high voltage power lines: A study in rural areas of Italy. *Landscape and Urban Planning*, *126*, 53–64. https://doi.org/10.1016/J.LANDURBPLAN.2014.03.003

Torquati, B., Giacchè, G., & Venanzi, S. (2015). Economic analysis of the traditional cultural vineyard landscapes in Italy. *Journal of Rural Studies*, *39*, 122–132. https://doi.org/10.1016/j.jrurstud.2015.03.013

Towse, R. (2019). *A textbook of cultural economics* (2nd ed.). Cambridge University Press.

Tuan, Y.-F. (1979). Space and place: Humanistic perspective. In *Philosophy in Geography* (pp. 387–427). Springer Netherlands. https://doi.org/10.1007/978-94-009-9394-5_19

Turner, K., Pearce, D., & Bateman, I. (1993). *Environmental Economics: An elementary introduction*. The Johns Hopkins University Press.

Wales, N., Murphy, R. J., & Bruce, E. (2020). Understanding patterns of vegetation change at the Angkor World Heritage site by combining remote sensing results with local knowledge. *International Journal of Remote Sensing, 42:2, 445-468*. https://doi.org/10.1080/01431161.2020.1809739

Wen, C., Albert, C., & Von Haaren, C. (2022). Nature-based recreation for the elderly in urban areas: assessing opportunities and demand as planning support. *Ecological Processes*, *11*(1), 44. https://doi.org/10.1186/s13717-022-00390-0

Chapter 3 - The Case Study City of Palermo (Sicily): Quality of Life and Historic Garden Management

3.1 Introduction

A walk through a city's historic gardens is a uniquely sensorial way to experience its story and identity. They are living palimpsests, showing signs of the environmental, political, socio-cultural, and technological conditions that made their formation possible, as well as how those conditions have changed and lead to transformations. Thus, it makes sense to look at historic gardens through the perspective of one representative city.

The city of Palermo (Sicily) offers a particularly fascinating laboratory for the influence of political, social and economic factors on historic garden management and fruition. Palermo is the capital of the autonomous Region of Sicily (Italy), located on the northwestern coast of the major island of the same name. It covers a total area of about 160.59 km^2 (ISTAT, 2017) and currently has a population of about 635,439 (ISTAT, 2022).

Palermo has been famous throughout history for its gardens, thanks to its warm Mediterranean climate, accessible water and biocultural diversity (Barbera & Speciale, 2015; Pirajno et al., 2015; Pirrone et al., 1989). However, this area once celebrated as the "*Conca d'Oro*", or golden basin, is also known for its brutal bombardment during the second World War and for the equally brutal urban sprawl that replaced much of its celebrated landscape just afterwards (Barbera, 2012; Pirajno et al., 2015).

Today, Palermo struggles with many issues very much intertwined with historic gardens, including the effect of economic and health crises on the management and visitation of green spaces, as well as issues related to socio-demographic changes, public austerity, urbanization, and sustainable development. These issues are not unique to Palermo, but widespread throughout Europe and the wider world, especially in historic urban landscapes (cfr. Bandarin & Oers, 2012; ICOMOS General Assembly, 2011; UNESCO, 2011).

3.2 Quality of Life Evaluations of Palermo

Indeed, in the 2022 annual quality of life classification carried out since 1990 by the Italian Business periodical, *il Sole 24 Ore*, Palermo was ranked 88th out of 107 (Sole 24 Ore, 2022). The score is given based on six indicators: wealth and consumption; business and work; justice and security; demographics and society; environment and services; culture and leisure. These are successively broken down into various sub-indicators. Although Palermo fell in the bottom half for all indicators, it showed improvement in the first three but worsening conditions in the last three. The environment and services indicator is particularly relevant to historic garden issues, with Palermo ranked 97th out of 107, and having descended three places since the precedent year's analysis.

Palermo's low quality of life score is also confirmed in scientific literature and in public statistics reports. Olsen et al.'s (2019) analysis of 66 cities located in 28 European countries, ranked Palermo fifth from last in terms of overall life satisfaction (just under 75% satisfied with life lead) based on data from the 2013 (European Union, 2013) and 2015 (European Union, 2016) Urban Audit.

In fact, Palermo was also one of the lowest ranking cities in many of the subcategories in the 2015 European Urban audit's comparison of 79 European cities, where most had generally high rankings. For example, Palermo was one of only five cities where more than half of the surveyed population expressed dissatisfaction with the city's green spaces. Specifically, 68% of Palermo residents were dissatisfied, with a decrease of 31% and drop in ranking of nine places compared to 2012. The 2015 audit also found that satisfaction with green spaces influences overall satisfaction with living in a city, with a correlation coefficient of 0.72. In addition to dissatisfaction with green spaces, more than half of respondents from Palermo also

expressed dissatisfaction with the following environmental and public service issues related to green space provision: dissatisfaction with the air quality (66%); dissatisfaction with the noise level (66%); dissatisfaction with the state of the built environment (78%); dissatisfaction with public spaces (57%). Respondents also showed their lack of faith and satisfaction in city government with more than half disagreeing with the statements that city administrative services help people efficiently (78%) are trustworthy (70%), and that the city is involved in fighting climate change (61%). Furthermore, 36% of respondents expressed dissatisfaction with the city's cultural facilities, placing Palermo third from last compared to other European cities (European Union, 2016).

Indeed, because of its autonomous privileges, Sicily governs its heritage differently than the rest of Italy, and in many ways this independence exacerbates problems in its management (Gelardi, 2007; Mazza, 2002; Rizzo, 2002). Historic gardens are particularly vulnerable because they are made up of living elements that may die if uncared for (Accati & Devecchi, 2005). The COVID-19 pandemic has further accentuated these problems but has also increased the importance of these sites to the public (Ugolini et al., 2020).

However, Palermo also has several advantages that could help turn things around. For example, the Sole 24 classification notes the city's mild climate, and high internet access (Sole 24 Ore, 2022). Olsen at al. (2019) also note that Palermo ranked fourth best in diversity of land-uses, with a Shannon's diversity index (SDI) just over 2.5, and fifth best in land-use distribution evenness with a Shannon's evenness index (SEI) just over 0.8. This means that Palermo has a wide variety of land-uses that are fairly evenly distributed. According to the authors, these equate to different affordances, i.e., possibilities the environment offers to an organism, that can affect health and wellbeing. This contrast between negative quality of life evaluations and abundance of landscape opportunities might indicate that Palermo has the potential to vastly improve its situation if it were to make better use of its resources.

A few years ago, this concept was taken up in public discourse, with historic gardens at the center of political and artistic discussions on the reworking of a positive identity for the Palermo area, linking the gardens to themes such as hospitality, inclusion, diversity, well-being and beauty (Manifesta, 2018). However, one must ask how much of this attention was purely promotional? Even more recently, the COVID-19 pandemic brought new attention to historic gardens, with more attention given to management difficulties. Most notably, Palermo was the recipient of three out of the eight grants recently awarded to Sicilian sites through a measure for the requalification of Italy's historic parks and gardens in Italy's National Recovery and Resilience Plan (NRRP) (*Ministero della Cultura*, 2022a).

3.3 Scoping Interviews with Historic Garden Stakeholders in Palermo

During the research for this dissertation, several scoping interviews were carried out. These interviews informed the research projects presented in the following chapters and paint a vivid picture of the complexities of historic garden management in Palermo from the point of view of specific stakeholders. Because participants were chosen via convenience sampling, and because a small number of interviews were conducted, they are left to speak for themselves without much interpretation. The first set of interviews regard historic garden management practices and are presented with a thematic approach; the second set of interviews are with third-sector parties involved with the care of historic gardens and are presented with a narrative approach (following Bryman, 2016).

3.3.1 Investigation of Management Practices in Palermo's Historic Gardens

In 2021, a written questionnaire was given to the responsible decision-makers overseeing the management of three representative historic gardens in the city of Palermo that are regularly open to the public: a municipal park, a botanic garden and a private estate garden. The questionnaire was designed following similar surveys in the literature (Brine & Feather, 2010; Connell, 2005; Hodor et al., 2021; Rostami et al., 2015) and following generally accepted ethical guidelines regarding informed consent and data treatment (following Bryman, 2016). It was structured in the following 10 sections: A) participant eligibility and consent; B) participant contact information and personal information; C) general information on the garden; D) garden accessibility; E) garden labor organization; F) garden capital costs; G) garden operational costs; H) garden income; I) impact of the COVID-19 pandemic on garden management; J) concluding thoughts and questionnaire evaluation.

After distributing the questionnaire to the participants, two to four appointments were set up, with each interview lasting from one to two hours. These sessions were carried out between March and April 2021 (on 09/03, 16/03, 20/04 and 23/04, 2021, for the public park; on 12/04, 15/04, 21/04, and 22/04, 2021, for the botanic garden as well as a clarifying personal communication made on 09/06/2022; on 11/03 and 25/03 for the private estate garden as well as a clarifying personal communication made on 08/03/2022). Participants were given a copy of the questionnaire form filled out by the interviewer, which they could add to or modify. Participants were not always able to answer the questions in the capital and operational costs sections (F and G) or answered in an imprecise manner. Thus, these two sections were not considered here. Responses to questions in section H about garden income were also inconsistent, so only the general income sources are reported, and not monetary values.

All three participants were over the age of 50 and have a five-year university degree. They have held their positions for one to four years, a relatively short time considering that all their predecessors had held their position for a few decades.

The gardens they oversee were built between the 18th and 19th century, with the park and estate garden originally designed as private ornamental gardens with an informal layout and the botanic garden built as such since its beginnings. The botanic garden has been regularly open to the public since its inauguration, while the public park opened during the late 20th century and the private estate opened regularly to the public in 2019. When asked what the present motives for keeping the gardens open to the public are, all participants reported that the main motive is providing a place for recreation and public enjoyment, while both the private and botanic garden reported being open to provide educational resources and to generate income for upkeep. In addition, the botanic garden reported being open to display scientific collections.

Each participant was asked what their historic garden's current mission is. The public park's response was to maintain and invest in the place's extraordinary botanic and landscape elements. The botanic garden's response was 1) the management and care of the scientific collections kept outdoors, in pots and in greenhouses as well as the Herbarium's *exsiccatae*, the *Xiloteca*, the *Carpoteca*, the *Spermatoteca*, the Library, the Seed Bank and the historic buildings; 2) the valorization of the above-mentioned heritage; 3) the promotion of knowledge through the cultivation and museological presentation of the collections, the organization of cultural events, as well as through research, teaching and the conservation of interesting, unusual, rare or threatened species; 4) the protection and conservation of plant species; 5) to provide the best maintenance and visiting conditions possible. Finally, the private estate garden's response was stimulating artistic creation since its beginnings, and today also giving the community a place for physical and mental rejuvenation through beauty.

Participants were then asked what they perceived their public mandates to be, i.e., the actions that they are duty bound to carry out in the public's interest. For the municipal park, these were: the protection of artistic, historical, and botanic heritage as well as assuring access to different user groups (nature lovers, scholars, families, tourists, and athletes); to promote social inclusion and integration. For the botanic garden, they were: to strengthen the role that botanic gardens play in European culture; to contribute to the culture and knowledge of the plant world at an international level; to concentrate the garden's activities on the study of plant biodiversity and conservation, as well as educating the public in this area; to carry out a role supporting university teaching and research; to promote the conservation of plants. For the private estate garden, they were: stimulating artistic composition and safeguarding heritage.

Two out of three of the gardens are owned and primarily managed by public entities. However, the botanic garden tenders visitor services to a non-profit entity and the public park tenders some of its regular upkeep to an incorporated business.

All three gardens are protected by national heritage laws (*Codice dei Beni Culturali e del Paesaggio*, 2004), although at the time of the survey both the public park and the botanic garden had not had their heritage status formally verified by city planning authorities.

Both the botanic and estate gardens belong to various heritage networks, which they pay for to benefit from being part of a community of similar institutions.

The gardens range in size from about 6 to 10 hectares, with most of the area accessible to the public. The park is freely open, while the botanic garden and estate garden both charge for entry. All three gardens maintain some form of web presence, with the two charging for entrance being the most active on social platforms and having significantly increased that activity while closed by public order during the pandemic. Both the botanic garden and private estate garden host scholarly or artistic projects that are not for profit.

In terms of labor, the botanic garden employs the most workers. During the reference years, it had just over twenty physical laborers, including field hands, gardeners, a pruner, and research assistants. However, it should be noted that all of these have annual contracts with a fixed number of days. In total, the garden paid for 3,250 days of physical labor in 2019 and 2,824 days in 2020. In addition, in 2019 the botanic garden had 13 full time employees dedicated to intellectual labor, which decreased to 10 in 2020. During both years, the garden also shared three employees with other structures, who dedicated more than 60% of their time to the garden. The botanic garden also has regular volunteers: two in 2019 and sixteen in 2020. However, their practical contribution to garden upkeep was reported to be minimal. During the reference years, some tasks were also tendered out to external firms, including: the pruning of large trees; dining and catering services; support for educational activities and special events; restructuring and repairing the greenhouses, restoration of monuments and masterplans for new areas.

In comparison, the public park reported employing fewer physical laborers, including a coordinator, gardeners and a general maintenance worker. In 2019, there were five full time manual laborers and four in 2020. Each works for 220 days year, for a total of 1,100 days in 2019 and 880 days in 2020. In 2020, another 14 part-time workers were brought in, who each worked 60 days a year, or 840 days all together. In addition, 10 intellectual laborers oversee park management, but dedicate less than 20% of their time to it because they also have other responsibilities. The public park also involves some volunteers grouped in an association; however, they also were reported to not contribute much to the practical upkeep of the garden. Services tendered out to external firms included the installation of irrigation systems, maintenance of work vehicles, custodians, and monument restoration.

Finally, the private estate garden reported having the simplest labor organization. It employed two full time and two part-time physical laborers during both reference years. Full-time

employees worked about 220 days a year and part time employees worked about 125 days a year for a total of 690 working days of manual labor for both reference years. Furthermore, two intellectual workers dedicated all their time to the garden in 2019, which increased to three in 2020. The garden also reported involving volunteers through an association; in 2020 they dedicated a total of 500 hours to custodianship of the garden. However, the private estate garden also reported that this activity did not contribute significantly to garden upkeep. Services tendered out include the pruning of monumental trees, the installation and updating of electrical systems, dining and catering services, procedures to comply with security and risk management norms, and architectural and art restoration.

In terms of garden income, the public park does not make any money, and pays for all its costs with funding from the municipal government. Because it is freely open to the public, there is no estimate of visitor numbers.

The botanic garden charges for an entry ticket, which is six euros at full price and is discounted for various visitor categories. In 2019, the garden counted 168,114 visitors while in 2020 there were 46,605 (a personal communication received on 09/06/2022, after the interview period, reported that the botanical garden had 76,189 visitors in 2021). The garden also generated income through special events such as a plant and book fair. In fact, the participant estimated that about 40% of the total visitors come during these special events. The botanic garden also receives some funding through private donations, sponsorships and public grants (e.g., during 2020 it received funds through the Italian Ministry of Culture's Art Bonus).

The private estate garden charges for entry. Before 2019, prices were privately agreed upon with interested parties. In July 2020, it opened to the public with a structured pricing plan that differentiates between an area of informal parkland and orchards and an area with walled romantic ornamental gardens and the historic residence. Because of how recent the opening was at the time of the interview, the private garden could not provide an estimate of visitor numbers (however, the participant later communicated having had 70,000 visitors and 14,000 annual pass holders during the year 2021). Admission to the former can be purchased through a daily ticket of three euros or visitors can purchase an annual pass of twelve euros, and discounts are also offered for certain visitor categories. The participant explained that this strategy purposely encourages visitors to purchase the annual pass and is meant to promote a sense of community and encourage visitors to care for the park as if it were their own. Entry prices can be kept low because visitors pay for other services. For example, visitors are asked to purchase all their food and beverages from the park's coffee bar instead of bringing food from home. Furthermore, admission to the estate's walled romantic ornamental gardens is extra and only allowed in preprogrammed moments. In 2020, entry was eight euro for annual pass holders. Other income is regularly generated from private events, food and hospitality services and site location leasing; however, these activities did not occur during the reference years due to the COVID-19 pandemic.

In fact, the COVID-19 pandemic significantly impacted all three gardens during the questionnaire reference years of 2019 and 2020. The public park went from being open 363 days during 2019, with the two closures due to strong winds, to being fully open for 290 days and open by reservation for 44 days during 2020. In 2020, it was closed for 31 days by public order in response to the pandemic, for three days due to strong winds and for one day for pest control. During 2020, various public health and security measures were enacted, including body temperature checks, regular sanitization of premises, provision of hand sanitizer dispensers, contingent entry, obligatory social distancing and mask waring, prohibition of groups and cancellation of events. All the physical laborers continued to work on site during 2020, while half of the intellectual laborers telecommuted regularly.

The botanic garden responded to the COVID-19 pandemic in much the same way as the public park. The two structures share the same number of open days, partially open days and closures for both years apart from the one for pest control. The same public health and security measures were enacted except for obligatory distancing. The botanic garden received some public financial support to aid its response to the COVID-19 emergency in the form of a revitalization grant from the Italian Ministry of Culture. Only one of the intellectual workers continued to work on site, while the remaining nine telecommuted. The physical laborers all continued to work on site but were grouped into two shifts in case one group had to be quarantined. Consequently, laborers worked far fewer hours.

The COVID-19 also drastically affected the private garden, prompting it to radically change its business model in 2019. As mentioned above, the garden had previously generated income through guided tours, hospitality and private events. Before 2019, most garden visitors were international garden, architecture or music history lovers coming in organized tour groups. The garden provided luxury services, i.e., extraordinary hedonic experiences that are exclusive in nature and whose luxuriousness is jointly determined by objective features and by subjective customer perceptions (Wirtz et al., 2020). When the pandemic interrupted this income source, the garden responded by opening a less delicate part of the property made up of informal parkland and orchards to the local community in July 2020. While the garden was completely closed to the public during 2019, it was only closed for 31 days in 2020 due to public health and safety orders. The same public health and security measures were enacted as for the botanic garden. During 2020, all employees continued to work on site.

Finally, participants were asked to describe the strengths, weaknesses, opportunities and threats of their garden given the current situation at the time of the interview. Only the public park and the botanic garden responded to this question. The public garden participant reported experience gained over time as a strength and lack of qualified personnel, dependence on sick or elderly personnel, and the widespread degradation of the garden as weaknesses.

Lack of personnel was also of principal concert for the botanic garden. The botanic garden participant stated that the number of technical personnel has significantly declined during the last twenty years. He also reported that a lack of turnover has seriously impeded the transfer of skills and knowledge from experienced workers to new workers. The participant feared that in a few years, the botanic garden would find itself without any workers that had experience and specialized skills in managing both their living and herbarium collections.

3.3.2 Investigation of Third Sector Participation in Historic Garden Care

In 2022, a second set of scoping interviews were carried out to explore third-sector participation in historic garden management. A desk interview was conducted with a representative of a non-profit association aiding the entire volunteer sector in Palermo (14/04/2022) and three walking interviews were conducted and transcribed with coordinators of non-profit associations taking care of historic green spaces in Palermo, with one located in the greater metropolitan area (02/03/2022), and two located within the city's historic center (22/04/2022 and 24/06/2022).

Interviews were participant lead, recorded for transcription and spatially referenced with a Global Positioning System (GPS) tracker. Walking interview participants were also asked to take a few meaningful photos of their site. The methodology for conducting the walking interviews and the interview leads was developed following: Daniels et al., (2014); Evans & Jones, (2011); Mert-Cakal & Miele, (2020); Milbourne, (2021); O'Neill & Roberts, (2019). The procedure followed the University of Palermo Bioethics Committee's protocol regarding informed consent and data treatment, assuring the anonymity of participants. Participants were asked to take the interviewer on a tour of the garden and were prompted in natural conversation

to talk about their garden management activities, their motives for dedicating time and resources to caring for the garden, the benefits they personally gain from this activity, the benefits that they feel they contribute to society through their activity and any critical issues that they feel might threaten the garden's existence or their personal involvement with its care. Each interview lasted about an hour.

3.3.2.1 A Desk Interview with an Association Promoting Volunteer Activities

On April 14th, 2022, a desk interview was conducted with a woman working with an association dedicated to promoting volunteer activities in the greater metropolitan area of Palermo. The participant described her impression of recent trends in the volunteer sector, noting that the COVID-19 pandemic seems to have accelerated a process that had begun a few years earlier, where citizens are increasingly interested in common resources, as well as their city and the specific neighborhood where they carry out their daily life.

The participant also described the national and local legislative framework guiding the volunteer care of public property. In Italy, volunteer organizations and activities are governed by the Third Sector Code (*Codice del Terzo Settore*, 2017). At the municipal level, most volunteer activities regarding public properties are governed by one of two formulas: one based on the principle of delegation of responsibility, and one based on the principle of shared responsibility. The latter follows the principle of subsidiarity as described in article 118 of the Italian Constitution, and has been applied in several municipalities throughout Italy, starting with Bologna (*Regolamento sulla collaborazione cittadini e amministrazione per la cura e la rigenerazione dei beni comuni urbani*, 2014). The participant felt that by actively sharing responsibility, governments and citizens could better avoid the tragedy of the commons, where common resources are abandoned because they belong to everybody and thus to nobody. Her association actively works to promote Bologna's regulation of citizen and government collaboration in the care of common goods. She cited several towns in the greater Palermo metropolitan area that they had convinced to adopt the regulation but noted that the municipality of Palermo itself still uses the more traditional delegation formula. In Palermo, if a citizen, association or business wants to take care of an urban green space, they make a formal request to the municipal administration to adopt it for a determined period (*art. 10 bis del regolamento del verde pubblico e privato, approvato con deliberazione del Consiglio Comunale* no. 355 del 16/10/2008). According to the participant, this severely limits what the interested parties can do in terms of activities and improvements. According to her, in this way the city administration takes no responsibility, aside from an annual check-up of the site. Furthermore, all the involved costs must be sustained by the parties adopting the space and only one legal entity can take responsibility for the adopted site, so a group of associations can't share the burden. The participant offered examples of adoption initiatives of urban green areas and historic gardens that had failed in Palermo. She felt that the various responsibilities and difficulties sustained by adoptees, including satisfying the City Planning and Heritage Authorities (the *Soprintendenza*), became too much for those involved and lead to burn out. She felt that collaborative support from government offices through the more flexible legal framework based on the Bologna Regulation would solve this problem, citing various successful cases in the nearby adhering towns.

3.3.2.2 A Cultural Association in Bagheria

On March 2nd, 2022, a walking interview was conducted in Bagheria, a town near Palermo that is part of its greater metropolitan area. The participant was one of the coordinators of a non-profit cultural association founded in 2018 by four young men that were born in Bagheria, but

two had studied and lived abroad in London together for about 10 years. While there, they enjoyed the city's many neighborhood parks. They had never had access to a public park in Bagheria and so they wanted to recreate that part of their every-day life abroad when they returned. They established their association to manages six hectares of parkland on a historic estate from the 18th century (Figure 4). The property is owned by a foundation, which runs a nursing home in a modern building on the site (the historic residence has fallen into disrepair).

Figure 4 - Entrance to Park on a Historic Estate in Bagheria

The participant recalled that when the association was first given use of the site, it had been quite abandoned. They began by clearing out brambles, dead trees and trash with the intention of providing a public service to their town. Today, thanks to their interventions, it is made up of a pine grove containing a playground and fair stands, a natural amphitheater used for outdoor concerts and shows, and a small petting zoo with horses, donkeys, and geese. At the time of the interview, the association was also building a mountain-bike circuit. They open the park to the public during the warm season, from March to September.

The participant was quite proud of the outdoor theatre that they had built, emphasizing that they had obtained the planning and heritage authority's permission. In August, they had held a concert with 1,000 seated spectators. He noted that the crowd would have been even larger had it not been for COVID-19 pandemic related limits. Another successful event, according to the participant, was a recent Christmas craft fair. In terms of regular attendance, he estimated that about 500 visitors come on an average Sunday with good weather. He also reported that the park is regularly visited by scout groups, schools, and people with children or dogs and that they also host a children's day-camp during the summer.

The participant felt that public administrations were finding it increasingly difficult to manage green spaces. His association had to do everything "with their own hands", including finding financial resources. At the same time, he noted that there was an increasing need for green spaces in cities. During the COVID-19 pandemic, he felt that the park was an important reference point for the local community. For example, various gyms used the park to hold their classes outdoors. In addition, children came to relax and see their friends when schools were closed. The participant felt that this was particularly important for people's mental wellbeing.

Although they don't charge for entry, the association does ask park visitors for a donation of one euro. The participant said that many people were happy to make the donation, and that it also contributed to changing the public mindset. He explained that people had become used to entering an abandoned property and doing whatever they wanted. He felt that people automatically abuse public property in his town, but if they donated some money they would act with more respect because they would feel that they were on private property. He felt that the overall public response to his association's activities was quite positive and that the residents of Bagheria were proud that some of their youth had decided to return to recover the city's patrimony. He hoped that his association's activities would help contribute to making his hometown a better place to live.

3.3.2.3 An Association Trying to Create a New Park in an Archeological Area

On April 22nd, 2022, a walking interview was conducted with two coordinators of a non-profit association founded in 2019 and a representative of the Sicilian regional heritage authority (*Assessorato dei beni culturali e dell'identità siciliana*) which owns the archeological area that they had been caring for. The two non-profit coordinators are young men that had just finished graduate programs and the heritage authority representative is a woman working as an archeologist at the regional archeological museum. The area in question (Figure 5) is a fenced-off excavation site extending over about 0.41 hectares and located in the economically depressed neighborhood of Valverde – Castello San Pietro, in the historic center of Palermo.

Figure 5 – Intended Site for a Community Park in an Archeological Area

The participants' involvement in the site began when one of the young men received a post-doctoral research grant from an international foundation to carry out a participatory urban regeneration project. He decided to use the grant to support the non-profit association's involvement with the archeological site. The other member of the non-profit association wrote his graduate thesis on the project. They chose the archeological area for their project because it is in the heart of the city center, is rich with cultural significance and potential but is also located in an underserved area. The neighborhood is without public amenities and services and made up of dense low-quality public housing built during the 1960s and 1970s. Furthermore, the participants explained that the area is vulnerable to further degradation because it is "white", i.e., left blank in the municipal planning documents.

They began their involvement by contacting the regional archeology museum to begin a process of collaboration. The regional heritage authorities had delegated responsibility for the site to the archeology museum about five years before, while it had been in the regional government's possession since 1986. For most of this time, the site has been closed to the public and abandoned. However, as explained by the archeologist participating in the interview, the site is historically quite important. It contains rare archeological layers from the 9th and 10th century, with artefacts testifying to the prevailing Islamic culture in Palermo during that time. However, she also explained that the residents don't perceive the site's cultural heritage value. For years, they used it as an unlawful garbage dump, and hid stolen goods and drugs there. When asked in interviews if they knew what an archeological excavation is or why archeological sites are important, they responded that they are "just a bunch of rocks". The museum representative thought that this might be partially because none of the current residents

had ever seen an archeological excavation being carried out (the last one on the site had taken place 36 years ago). She noted that in her experience with other urban excavations, people respond to excavations with curiosity and engagement.

The non-profit participants began their project by studying the neighborhood using various participatory methods, including interviews, questionnaires and organized activities, with the aim of involving all neighborhood stakeholders, from the residents of the surrounding buildings to the local school's students and teachers, to the unlicensed car parkers occupying the lot surrounding the site. The participant with the research grant reported conducting 86 interviews and noted that the graduate student had conducted many others.

The participants felt that the area seemed physically and socially cut-off from the rest of Palermo's historic center and the institutions that govern it. They also felt that the few institutions and organizations active in the area didn't collaborate with one another, apart from a recently organized network of educational facilities including the archeological museum, the Music Conservatory, an elementary school, and a nursery school. They aimed to help remediate this problem, as well as re-animate the archeological site through their participatory design process. Through work with stakeholders to draw out what the neighborhood wished for and expected from the site and to improve the neighborhood's relationship with its cultural patrimony, they understood that the residents wanted a public green area with trees.

After this investigative phase, they began work on what they called a "piazza-garden" of about 1,500 square meters located in a less delicate part of the site. Over a period of about eight months, they designed and installed their project together with the residents and the archeological museum staff. In June 2021, they began clearing out the brambles and weeds with assistance from maintenance workers from the museum, the office for agricultural development (*Ente di Sviluppo Agrario*) and the regional forestry service (*Corpo Forestale della Regione Siciliana*).

In October 2021, they opened the site to the public for the first time for a large stewardship event. They had not been able to organize any public events for the two preceding years because of the COVID-19 pandemic and did not know what to expect. They reported being happily surprised by a turnout of about 80 people, who worked together to continue to clear the area of weeds and trash, paint pots with local children and fill them with soil and donated plants. The materials were donated by participants and by the city administration. During the winter, they continued to prepare the area for public use by installing wooden furnishings, more planted pots and low wooden fencing. They explained that the idea was to make the area safe by putting up barriers around the excavation sites and to animate the area by putting in an allotment garden, ornamental potted plants, benches and informational signage on the history of the site and the archeological excavations. These additions had to be low-impact and impermanent to protect and conserve the archeological patrimony beneath the soil surface.

Unfortunately, in March 2022 they had arrived at the site to find everything burned in a bonfire and destroyed. Bonfires are traditionally lit in Palermo for St. Joseph's Day on March 19th. They suspected that the perpetrators were some of the same residents that they had been working with the whole time. In the wake of this disappointment, they expressed various reactions. The participants admitted that they are aware that third sector organizations have their limits, and that they had made several mistakes. However, they felt that those mistakes were also an opportunity for growth. Overall, they were proud that they had involved about 500 people in their project, including residents and volunteers, since its beginning. They hoped that the media coverage of the vandalism would keep people talking about the area, so that they would continue to be interested in its potential.

When asked what motivated them to continue their work, the two participants from the association responded that they were strongly driven by love for their homeland. They

explained that most of the members of their association were young men and women under the age of thirty who had had the opportunity to study and work internationally, but who had chosen to return to their birthplace and use their abilities to restore and requalify its patrimony for future generations. Having come from more affluent parts of the city, they were also motivated by a desire to contribute towards creating a more equitable society where people of all classes have access to public amenities such as public green spaces.

However, they recognized that their continued involvement with the area was uncertain. Their activity thus far had been made possible by outside funding from the research grant. Now that that had ended, they hoped to find other ways to make their association economically sustainable. At the time of the interview, they fundraised through an annual membership campaign and by selling merchandise with the association's logo. However, the participants explained that members of the association were also beginning professional careers and couldn't dedicate all their time to unpaid activity. They hoped to develop the association into an economically sustainable collective of people who collaborate in urban renewal and place-making projects that would be able to receive grants for municipal, regional, national and European funding.

Most of all, the vandalism of the site had deeply hurt and disillusioned them. The fact that the same residents that they had worked with had probably been the instigators of the bonfire made them question whether they had allowed their relationship to become too close and informal, thus leading to a lack of respect. The vandalism had also caused a significant loss in resources; in addition to what the fire destroyed directly, they also lost promised funding for a calisthenics circuit because the donor no longer felt it would be a secure investment. They were also discouraged by the difficulty that they had experienced interacting with the public administration, apart from the archeological museum staff.

At the time of the interview, they were unsure on how to move forward from the unfortunate event. The representative of the museum expressed a desire that the association continue their efforts, not just because the area needed care but also because she felt that the people living there also needed it. She also expressed frustration that the city of Palermo did not adhere to the above-mentioned subsidiarity regulation facilitating co-responsibility between private and government entities, which she felt would be helpful in creating a wider network of interested parties that could share responsibility for the site. She proposed that a new excavation might help engage residents with the site but did not know who would have the resources for such an endeavor.

3.3.2.4 A Community Center Caring for a Historic Cloister Garden

The last walking interview was carried out on June 24th, 2022, with one of the coordinators of a community center and lending library located in a city-owned property within the Kalsa neighborhood of Palermo's historic center. It contains a small cloister garden of about 800 square meters whose origins date back to the 16th century (Figure 6). The social center had adopted the property from the city in August 2019.

Figure 6 - Cloister Garden Cared for by Community Center

Before that, the garden had been semi-abandoned with care from city workers and local residents. The participant remembered that custodians of nearby city offices sometimes cleaned the garden and harvested the fruit, noting that they also did some rather naïve things like planting a Christmas tree right in the middle. Before that, the garden was cared for by the nuns living in the adjoining monastery.

She remembered being discouraged from caring for the garden at first by city officials. However, the community center wanted to convince the city that the garden would be an important social resource under their care. She remembered that it was quite difficult even knowing who to talk to about the matter. Each public office she approached told her that it was another office's responsibility. At the same time, some locals started demanding that a monumental plane tree in the garden be cut down because they felt that it created too much leaf litter, attracted pests and because they were afraid that it might be unstable. The association was alarmed that the tree might be unnecessarily cut down and responded by going to the city office with a report on the tree's monumental status and general health; they were able to convince some well-known experts to accompany them, who the city also often uses as consultants. According to the participant, the visit seemed to convince the city officials that they could be trusted with the general maintenance of the garden.

At first, they were given informal permission to clean it up for use. They were able to open the community center and the garden to the public in September 2020, with the delay due to COVID-19 measures closing public spaces. To get it ready for the inauguration quickly, they had to hire gardeners and a dumpster with their own money. After that, they went through the formal procedure to adopt the garden from the city. The participant felt that this form of

delegation is a way for the city to absolve itself of risk and responsibility. However, she also felt that the bureaucratic process was a little complicated but "not terrible". The community center was required to get the city offices of urban greening, the historic center and the heritage authorities to revise and approve their management plan and were given formal permission to take care of the garden on March 8th, 2021. Although they rent the building space, this form of agreement lets them use the garden and city water for irrigation free of charge. However, they must renew their adoption contract annually, and keep the garden freely accessible to the public. The participant noted that interacting with authorities every year was an adventure. She felt that there are far too few people manning the city office of urban greening and was worried that all their past contacts had retired that year.

She explained that the community center continues to carry out seasonal maintenance by holding a party where people come to eat, drink and care for the garden. They also have added a gardening tool section to their lending library and have held a gardening class in the garden. Both activities have encouraged new volunteers to come and care for the garden. At the time of the interview, they had also recently received a government grant for children's educational activities providing funds to pay for a professional gardening service once a month.

The participant felt that the garden serves an important social and environmental purpose. It is a place where students and professionals come to work on their laptops, and where local children come to play. The community center has also led the local children in planting some flowers and putting botanic labels on plants. She felt that the fruit in the garden was the most important thing in terms of public engagement. Children come to the library to read, then they walk around the garden to pick and eat the mandarin oranges. She noted that this kind of experience normally can't be found in the city. She felt that it played an important role in connecting urban children with nature and seasonality.

At a personal level, she reported being motivated to dedicate her time and energy to the garden by its sheer beauty. She felt grateful to be able to conduct meetings in a pleasant outdoor space and to bring her son there to play. She also loved the connections made with other people over simple pleasures. Finally, she felt that opening the space and pushing the city administration to listen were important political acts. She noted that so many institutions in southern Italy are slow to move, and cultural sites often can't open because the people involved aren't able to just take advantage of what already exists. She explained that there are many tiny things that should be easy to fix, like a missing foot on an antique marble bench, but nobody takes the trouble. Instead, they fixate on big projects that never get carried out.

When asked what might make her throw in the towel, she replied that one of the most frustrating aspects of caring for the garden is the impossibility of obtaining the appropriate permits and the sometimes-ambiguous stance public officials take to avoid responsibility. For example, she described how the adoption contract gives them permission to freely use city water to irrigate but not for a fountain where they keep goldfish. When they offered to pay for the extra water, a public official told them that there was no formula for that but that the water could still be interrupted at any time because they were in violation of their contract. She described another example regarding their application for a European Union grant that would let them install a public water fountain. At first, their application was blocked by a bureaucrat in the city planning office who refused to approve it because it didn't fit with the city's planning documents from thirty years ago. After going several times to talk his ear off about how important the garden is for the community and how valuable a water fountain would be, she reported that they became friends and he changed his mind. She remarked that if there hadn't been that personal connection, the grant application would have been stopped. What would happen, she worried, if next year whoever is in charge isn't on their side and tells them that they can't renew their adoption contract? Although a lot of progress had been made, she still

didn’t feel that the community center’s existence was altogether stable, perceiving the main threat being the generally unstable nature of the political system itself.

3.3.3 Interview Conclusions

These interviews are presented to help the reader become familiar with different kinds of historic gardens, their management practices and the different kinds of people who care for them. They also were an important first step in identifying and refining the research questions investigated in later chapters.

Participant responses in the first set of interviews revealed that providing recreation and enjoyment is a central mission for all historic gardens. However, this must also be balanced with responsibilities regarding biodiversity and heritage conservation, public education, and art and knowledge creation. Responses also highlighted the strengths and weaknesses of each garden's management practices as well as the opportunities and threats of managing a historic garden in the 21st century, from the need for qualified personnel to the need to find creative ways to generate income. Furthermore, the interviews showed how the COVID-19 pandemic has challenged the gardens to find alternative sources of income and ways to keep the gardens open to the public while following public health and safety measures.

The second set of interviews revealed the various ways in which citizens, volunteer organizations and civil servants interact to manage and maintain public green spaces in Palermo and the surrounding towns of the greater metropolitan area. The photographs taken by participants represent the sites, showing that in each case there is a low maintenance management model, which concentrates on providing accessible green space rather than living monuments or collections. Participants described a variety of experiences, ranging from success stories to instances of vandalism and lack of community support. Despite the difficulties, the interviews showed the importance of personal connections, the need for a flexible legal framework, and the potential outcomes achievable by grassroots organizations in providing social and environmental resources for the local community.

These interviews opened up many questions regarding how to better maintain and manage historic gardens, the role of citizens in caring for public green spaces, the need for legal frameworks that are more flexible and adaptive to change, and the potential of grassroots organizations to make an impact on the environment and local communities. The interviews also highlighted the need to find more sustainable and resilient forms of economic support for historic gardens. Furthermore, the interviews revealed how the pandemic has made it even more important to consider how to best use public resources to protect and care for historic gardens in a responsible manner.

The following dissertation chapters focus on exploring how these issues are addressed within the existing literature on historic garden management in chapter four, the complicated and often inefficient political system governing historic gardens in chapter five and the value of public engagement in chapter six.

Chapter 3 References

Accati, E., & Devecchi, M. (2005). Il restauro del giardino storico. *Italus Hortus*, *12*(4), 17–30. http://www.italushortus.it/phocadownload/review/review_2/02.accati.pdf

Bandarin, F., & Oers, R. van. (2012). *The historic urban landscape: managing heritage in an urban century*. Wiley Blackwell.

Barbera, G. (2012). *Conca d'Ora*. Sellerio editore.

Barbera, G., & Speciale, M. (2015). *Meraviglie Botaniche, Giardini e Parchi di Palermo*. Assessorato dei beni culturali e dell'identità siciliana.

Brine, A., & Feather, J. (2010). The information needs of UK historic houses: Mapping the ground. *Journal of Documentation*, *66*(1), 28–45. https://doi.org/10.1108/00220411011016353

Bryman, A. (2016). *Social research methods* (5th Edition). Oxford University Press.

Codice dei beni culturali e del paesaggio (2004). Decreto legislativo no. 42 and successive modifications, *Gazzetta Ufficiale della Repubblica Italiana* no. 45 del 24-02-2004 - Suppl. Ordinario no. 28. https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2004-01-22;42

Codice del Terzo settore, (2017). Decreto legislativo no. 117, *Gazzetta Ufficiale della Repubblica Italiana* no. 179 02/08/2017, suppl. Ordinario no. 43. https://www.normattiva.it/atto/caricaDettaglioAtto?atto.dataPubblicazioneGazzetta=2017-08-02&atto.codiceRedazionale=17G00128&tipoDettaglio=multivigenza&qId=&tabID=0.05944945572492255&title=Atto%20multivigente&bloccoAggiornamentoBreadCrumb=true

Connell, J. (2005). Managing gardens for visitors in Great Britain: A story of continuity and change. *Tourism Management*, *26*(2), 185–201. https://doi.org/10.1016/j.tourman.2003.10.002

Daniels, J. M., Robbins, A. S. T., Brinkley, W. R., Wolf, K. L., & Chase, J. M. (2014). Toward estimating the value of stewardship volunteers: A cost-based valuation approach in King County, Washington, USA. *Urban Forestry & Urban Greening*, *13*(2), 285–289. https://doi.org/10.1016/j.ufug.2014.01.004

European Union (2013). Quality of life in cities: Perception survey in 79 European cities. In *European Urban Audit* (pp. 1–145). Publications Office of the European Union. https://web.archive.org/web/20220901015201/http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/urban/survey2013_en.pdf

European Union (2016). Quality of life in European Cities 2015. In *Flash Eurobarometer 419* (pp. 1–169). Publications Office of the European Union. https://doi.org/10.2776/870421

Evans, J., & Jones, P. (2011). The walking interview: Methodology, mobility and place. *Applied Geography*, *31*(2), 849–858. https://doi.org/10.1016/j.apgeog.2010.09.005

Gelardi, S. (2007). *Diritto dei beni culturali e ambientali - Corso di legislazione dei beni culturali*. Palumbo, Editore.

Hodor, K., Przybylak, Ł., Kuśmierski, J., & Wilkosz-Mamcarczyk, M. (2021). Identification and analysis of problems in selected European historic gardens during the COVID-19 pandemic. *Sustainability*, *13*(3), 1–18. https://doi.org/10.3390/su13031332

ICOMOS General Assembly (2011). *The Valletta principles for the safeguarding and management of historic cities, towns and urban areas: Vol. XVII*. https://www.icomos.org/Paris2011/GA2011_CIVVIH_text_EN_FR_final_20120110.pdf

ISTAT (2017). *Basi territoriali e variabili censuarie*. https://www.istat.it/it/archivio/104317

ISTAT (2022). *Popolazione residente al 1° gennaio: Tutti i comuni*. http://dati.istat.it/viewhtml.aspx?il=blank&vh=0000&vf=0&vcq=1100&graph=0&view-metadata=1&lang=it&QueryId=19101&metadata=DCIS_POPRES1#

Mazza, I. (2002). 4. Organization and decision-making in the heritage sector in Sicily. In I. Rizzo & R. Towse (Eds.), *The economics of heritage: a study in the political economy of culture in Sicily* (pp. 48–62). Edward Elgar Pub.

Mert-Cakal, T., & Miele, M. (2020). 'Workable utopias' for social change through inclusion and empowerment? Community supported agriculture (CSA) in Wales as social innovation. *Agriculture and Human Values*, *37*(4), 1241–1260. https://doi.org/10.1007/S10460-020-10141-6/TABLES/5

Milbourne, P. (2021). Growing public spaces in the city: Community gardening and the making of new urban environments of publicness. *Urban Studies*, *58*(14), 2901–2919. https://doi.org/10.1177/0042098020972281

Ministero della Cultura (2022a). Allegato B2: Graduatorie delle proposte ammesse a finanziamento suddivise per macroaree - MACROAREA SUD. In *Decreto SG no. 504 21/06/2022 Approvazione della graduatoria di merito complessiva delle proposte ammesse a valutazione di parchi e giardini*. https://media.beniculturali.it/mibac/files/boards/be78e33bc8ca0c99bff70aa174035096/Bottoni/Recovery/PDF/DDParchiGiardini/AllegatoB2_Sud%20(1).pdf

O'Neill, M., & Roberts, B. (2019). *Walking methods: Research on the move*. Routledge.

Olsen, J. R., Nicholls, N., & Mitchell, R. (2019). Are urban landscapes associated with reported life satisfaction and inequalities in life satisfaction at the city level? A cross-sectional study of 66 European cities. *Social Science & Medicine*, *226*, 263–274. https://doi.org/10.1016/J.SOCSCIMED.2019.03.009

Pirajno, R., Flaibani, A., Barbera, G., & Raimondo, F. M. (2015). *Guida ai giardini pubblici di Palermo* (R. Pirajno & A. Flaibani, Eds.) Salvare Palermo.

Pirrone, G., Mauro, E., & Sessa, E. (1989). *"Palermo, detto paradiso di Sicilia" (Ville e Giardini, XII-XX secolo)* (Vol. 1). Centro Studi di Storia e Arte dei Giardini.

Regolamento del verde pubblico e private (2008). Palermo Consiglio Comunale deliberation no. 355 of 16.10.2008. https://www.comune.palermo.it/js/server/uploads/_22092022093749.pdf

Regolamento sulla collaborazione cittadini e amministrazione per la cura e la rigenerazione dei beni comuni urbani (2014). Comune di Bologna. http://www.comune.bologna.it/sites/default/files/documenti/REGOLAMENTO%20BENI%20COMUNI.pdf

Rizzo, I. (2002). Heritage conservation: The role of heritage authorities. In I. Rizzo & R. Towse (Eds.), *The economics of heritage, a study in the political economy of culture in Sicily* (pp. 31–47). Edward Elgar.

Rostami, R., Lamit, H., Khoshnava, S., Rostami, R., & Rosley, M. (2015). Sustainable cities and the contribution of historical urban green spaces: A case study of historical Persian gardens. *Sustainability*, *7*(10), 13290–13316. https://doi.org/10.3390/su71013290

Sole 24 Ore (2022). *Qualità della vita 2022: La classifica delle province italiane dove si vive meglio. Bologna la migliore nel 2022 | Il Sole 24 ORE*. Qualità Della Vita 2022. https://lab24.ilsole24ore.com/qualita-della-vita/palermo

Ugolini, F., Massetti, L., Calaza-Martínez, P., Cariñanos, P., Dobbs, C., Ostoic, S. K., Marin, A. M., Pearlmutter, D., Saaroni, H., Šaulienė, I., Simoneti, M., Verlič, A., Vuletić, D., & Sanesi, G. (2020). Effects of the COVID-19 pandemic on the use and perceptions of urban green space: An international exploratory study. *Urban Forestry & Urban Greening*, *56*, 126888. https://doi.org/10.1016/J.UFUG.2020.126888

UNESCO (2011). *Recommendation on the Historic Urban Landscape*. https://whc.unesco.org/uploads/activities/documents/activity-638-98.pdf

Wirtz, J., Holmqvist, J., & Fritze, M. P. (2020). Luxury services. *Journal of Service Management*, *31*(4), 665–691. https://doi.org/10.1108/JOSM-11-2019-0342/FULL/XML

Chapter 4 - A Systematic Literature Review of Historic Garden Management and its Economic Aspects

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Sustainability 2020, 12(24), 10679; https://doi.org/10.3390/su122410679[1]

[1] This published article is printed here with modifications made to formatting and section numbering to harmonize with the rest of the dissertation. Its main text remains the same.

Front Matter

Abstract

Historic gardens are important parts of humanity's built heritage within the designed landscape, providing many environmental, economic and socio-cultural benefits. Management is a key part of their conservation, perhaps the most difficult because it is costly, must be continual, and requires a skilled workforce. This systematic review looks at the literature addressing historic garden management, with special attention regarding the social, economic and environmental aspects of sustainability. Academic studies on this subject come from many different disciplines, making it both stimulating and fragmented. It is now time to consolidate these interdisciplinary efforts into a clear vision, including a framework of key themes and research methods so as to better coordinate efforts and make the information and innovation generated more accessible to the garden managers "in the trenches". With this aim, reviewed studies are classified according to 10 criteria: supply or demand orientation; management phase involved; primary sustainability processes addressed; geographic criteria; number of sites covered; policy documents referred to; kind of data collected; study methods employed; possibility of bias specifically regarding historic gardens; garden use. An analysis of these criteria shows that historic garden management literature focuses on describing the gardens themselves, with few studies interested in the people supporting them. Future research should follow recent policy documents' lead and pay more attention to community value and involvement.

Keywords: Historic garden types; Social, economic and environmental sustainability; Urban landscape; Heritage management; Heritage value assessment; Conservation planning; Conservation policy; Interdisciplinary approaches

4.1 Introduction

Historic gardens are precious natural and cultural heritage sites that provide many socio-cultural, environmental, and economic benefits. Because they are made up of living elements, they require constant, qualified, long-term management to ensure their survival. They also have very high fixed costs and are capital intensive. For this reason, management has continued to be one of the greatest challenges to their sustainable conservation and to guaranteeing all of the many benefits that they provide.

Before beginning, it bears asking: what exactly is intended by "historic garden management"? Although there is an ongoing academic discourse trying to pin down the term "management", it is generally understood as the process through which "organizations set and achieve their objectives by planning, organizing and controlling their resources" (Cole, 2004). Thus, management can be understood as the carrying out of the objectives of external and internal stakeholders, in this case, the community, visitors, and owners.

These management objectives have probably changed greatly over the lifetime of any historic garden. While once used primarily for individual pleasure, they are increasingly valued by society as a whole and maintained for their external sociocultural and environmental benefits, especially in the historic urban landscape (Connell, 2005). The first modern documented guidelines regarding conservation-oriented garden management were written by Antoine Dézallier d'Argenville at the beginning of the 18th century, for the great French Gardens of André Le Nôtre (Accati & Devecchi, 2005). At the same time that these and other royal gardens became important national symbols during the Imperial age, garden visiting developed hand-in-hand with the Grand Tour, a cultural trip around Europe taken by the upper-class as the capstone of their education (Zuelow, 2016). The rise of garden visiting, especially in Great Britain, would change the focus of historic garden management from pleasing the estate's family to satisfying a widening public (Connell, 2005). These two origins are emblematic of the two principal internal objectives guiding historic garden management today: conserving the site's cultural and natural heritage and satisfying visitor needs. Achieving both requires a great deal of interdisciplinary knowledge, especially if the two objectives are to complement and not contrast one another.

Heritage conservation management principles are defined by international guiding documents and treaties dating back to the Athens Charter of 1931 (Goetcheus & Mitchell, 2014). These documents sometimes distinguish between two facets of conservation: that of care (maintenance and management) and that of repair (restoration and reconstruction). Other guiding documents see the two as part of a continual conservation management process. It should be noted that the use of the term "maintenance" was more commonly used in 20th century documents when historic gardens were valued as material heritage purely for their monument value, while the use of the term "management" grew as they also became valued for their immaterial heritage and cultural significance. Indeed, historic gardens may have inspired this development in how all cultural heritage is identified and valued (Goetcheus & Mitchell, 2014). It should also be noted that historic gardens are not always referred to specifically by that name. According to their focus, policy documents may also address historic gardens under different labels, including "historic" (ICOMOS, 1964) or "culturally significant sites" (Australia/ICOMOS, 1979), "living monuments" (ICOMOS-IFLA, 1982) or "cultural landscapes" (European Landscape Convention, 2000). Furthermore, there has been an evolution away from monument-centric terms that only indicate the material fabric of heritage towards terms that include intangible aspects as well (Gao & Dietze-Schirdewahn, 2018). This shift has been accompanied by a growing recognition of the community's role in landscape conservation and a change in the experts' role from gatekeeper to facilitator. In addition, heritage has been recognized as not only historically and culturally important but also an

essential factor in promoting sustainable development and wellbeing. Heritage conservation is a key policy point of documents such as the United Nations (UN) Sustainable Development Goals (United Nations, 2015a) —Target 11.4, "Strengthen efforts to protect and safeguard the world's cultural and natural heritage". This emphasis on sustainability can also be seen in the European Landscape Convention's definition of landscape management as "action, from a perspective of sustainable development, to ensure the regular upkeep of a landscape, so as to guide and harmonize changes which are brought about by social, economic and environmental processes" (European Landscape Convention, 2000). Thus, we can conclude that historic garden management must be operational, continual and sustainable; it involves multiple stakeholders, and most of all, must be adaptive. In the true sense of the term practice, it is never completed and always improving. That is why it is especially useful to conceive of historic garden management as a cyclical process that loops through a strategic phase, an operational phase and an assessment phase. The strategic phase involves defining long term stakeholders, significance, responsibilities and constraints; the operational phase is carried out within a given time frame and involves short-term actions, contracts and actors directly involved in management; the assessment phase regards the continuative monitoring of goal achievement, critical issues and policy implementation (Cazzani et al., 2019). This vision of a multiphase conservation management process is common throughout operational guiding documents such as the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage List Operational Guidelines(UNESCO, 2021), the Australia/International Council on Monuments and Sites (ICOMOS) Burra Charter for Places of Cultural Significance (Australia/ICOMOS, 1979), Natural England and English Heritage's Guidance Notes (Natural England, 2008) and the United States of America (USA) Department of the Interior's Guidelines for the Management of Cultural Landscapes (Birnbaum & Madigan, 1996).

However, the ideal vision proposed in these policy documents often does not find its way into practice. National, regional and municipal planning measures fail to support historic gardens because they are out of date or because historic gardens fall between the more easily identifiable categories of architectural and natural heritage. Without more support, owners and managers are hard-pressed to keep up with even the day-to-day operations of their property, and gardens can easily slide into decay. Specifically, they struggle with financial resources (Askwith, 2009; Meda & Rinaldi, 2006), human capital (Albericci, 2006; Boisset, 1980; Meda & Rinaldi, 2006; Sales, 2000; Thoday, 2014) and information management (Brine & Feather, 2010; Counsell, 2001). Many have undergone a change in ownership from private estate to the public park, entailing a loss of compositional legibility; relationship with internal architecture and surrounding rural or urban context; number and diversity of botanic, architectural and decorative elements; agricultural or productive areas; continuous qualified care by the same gardeners in favor of discontinuous municipal gardeners or external firms; altered or destroyed views and vistas of the surrounding landscape (Cazzani et al., 2019). This all erodes the garden's identity, an intangible value strongly linked to the character, spirit of the place, and significance, at the heart of conservation theory (ICOMOS General Assembly, 2011).

In order to safeguard both public (Cazzani et al., 2019) and private (Brine & Feather, 2010) historic gardens, efficient management tools and strategies need to be developed and evaluated that specifically address social, economic and environmental sustainability. Academic interest in this topic began in the 1980′s, around when the Florence Charter officially identified historic gardens as living monuments (ICOMOS-IFLA, 1982). The first decades of research generally focused on establishing the broader merits and principles of historic garden conservation. Around the time the European Landscape Convention was ratified in 2000, the best practice conservation guidelines mentioned above had been established. This was when the academic discourse began to assert itself and to branch out. In addition to the essays and historical case studies from Art and Architecture historians that were already being produced, contributions

from many other fields began to appear. An early comprehensive review of historic garden management was published by Clare Askwith in 1999. However, in her article, "The economic contribution of historic parks, gardens and designed landscapes: a review of existing data and research recommendations for future research" (Askwith, 2009), she must rely on a great deal of gray or flawed literature and can only address the United Kingdom (UK). Askwith concludes that information is lacking in everything from basic stocktaking to historic gardens' impact as tourist attractions, to their role in local area economic regeneration, and finally their valuation as non-market goods.

Since Askwith's article, research has continued to branch out to new geographic areas and new disciplines. Researchers are increasingly interested in historic gardens' contributions to sustainability, and not just their material conservation. They also benefit from more historic gardens being recognized, restored and functioning, thus providing a wider selection of study subjects. Today, the literature is spread out among many diverse academic fields, including Applied Botany; Communications; Environmental Valuation and Appraisal; Heritage Studies; Horticulture; Landscape Architecture; Tourism Studies; and Urban Studies. Each applies its own particular perspectives and methods. Although rich with possibility, the resulting fragmentation impedes a clear vision of the current state of historic garden management studies and the various research tools available.

In order to make sense of such a varied corpus, this systematic literature review categorizes historic garden management publications according to 10 different criteria, including supply or demand orientation, management phase involved; primary sustainability processes addressed; geographic criteria; number of sites covered; policy documents referred to; kind of data collected; study methods employed; the possibility of bias specifically regarding historic garden study; historic garden use. The resulting groups reveal trends in the literature as well as the most significant gaps. Through them, this complex interdisciplinary field is mapped out, and insight is gained on the range of methods and research tools used to understand historic garden management and assess the many contributions made by historic gardens to social, economic and environmental sustainability.

4.2 Materials and Methods

This article is based on a systematic review of records indexed in Scopus and Web of Science (WoS) and follows the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines (Moher et al., 2009) (Table 1). Initial trial search queries with various keywords began in January 2020, and the final verified search was carried out in each database on 15 October 2020. The search query used in Scopus was: (TITLE (historic * AND garden* AND management OR econ*) OR TITLE-ABS-KEY ("historic* garden*" AND management OR maintenance OR upkeep OR econ*)). The search query used in Web of Science was: TITLE: ((historic* garden*) AND (management or econ*)) OR TOPIC: ("historic* garden*") AND TOPIC: (management OR maintenance OR econ*). The obligatory term "historic garden" was chosen in order to concentrate directly on research that identified itself as pertaining to historic gardens, as opposed to implicitly connected research under other related labels (i.e., cultural landscapes, designed landscapes, historic parks, etc.). The optional keywords management, maintenance and upkeep, were chosen in order to capture as wide a sample of management-related articles as possible, with keywords commonly used in relevant policy documents. The keyword econ* was added after initial trial searches failed to collect economic literature in the two chosen databases. Documents were considered in any language, and Google translator was used to aiding the reading of studies written in languages other than English, Italian or French. The initial Scopus search yielded 57 documents, and the initial Web

of Science search yielded 31 documents. Twenty-seven records were repeated in both databases, making the combined list of documents under consideration 61. The identified publications were then screened based on their title and abstract to make sure that they focused on the management issues of historic gardens. Six publications were excluded at this point because they were inaccessible (5) or off-topic (1). Those that passed the screening were then accessed and read in their entirety. At this stage, another 5 articles were excluded because they were off-topic, repeated research published in another document within the review or was a book in which separate chapters had already been counted in the review. Finally, the remaining 50 documents were included in the historic garden management literature review.

Table 1 - Document Search and Selection Process

Systematic review step	Information flow	Records excluded and reasons for exclusion
Identification	Records identified via Scopus search (n = 57) Records identified via WOS search (n = 31)	Duplicates removed (n = 27)
Screening	Records screened based on titles (n = 61)	Records excluded based on title screening (n = 6): Binney &. Hills 1979 – inaccessible; Wright 1979 – inaccessible; Koylu & Karacor 2010 – inaccessible; Ishikawa 2014 – inaccessible; Aaltonen, Ahola, & Artto 2017 – off-topic; Ruiz 2020 – inaccessible.
Eligibility	Full-text articles assessed for eligibility (n = 55)	Full-text articles excluded (n = 5): Negbi 1991 – off-topic Brine 2002 – thesis whose results are published in an included study; Natale, Pulga & Guarino 2010 – off-topic; Papafotiou & Kanellou 2010 – off-topic; Harney 2014 – Book with individual chapters separately identified.
Inclusion	Studies included in the systematic review (n = 50)	

Data were collected on each publication by reading the full text and classifying it according to the following criteria: supply or demand orientation; management process phase involved; sustainability themes addressed (social, economic, or environmental); geographic characteristics of the study (scale, country, continent); number of sites investigated; kind of information gathered and communicated (empirical or theoretical); eventual policy references; research instruments; possibility of bias in the study specifically regarding historic garden research; garden use addressed, i.e., general, public, tourist, or private (Table 2). Bias is

assessed according to whether definitions and principles in the reviewed study are taken from named policy documents and whether the information is empirically gathered. 1 point is given for each parameter, with a possible bias score ranging between 0 and 2.

Table 2 - Research Questions, Data Collection Criteria, and Classification Categories

Research question	Data criteria	Categories
1. How much of historic garden management research is concerned with the gardens themselves and their owners/managers (i.e., supply), and how much is concerned with the visitors enjoying the gardens (i.e., demand)?	Supply/demand	Supply—looks at the gardens themselves, their material fabric and their significance; Demand—looks at garden visitors and their interest, consumption, satisfaction and attributed value for historic gardens.
2. What phase of the management process is being addressed?	Management phase *	Strategic phase—historic garden analysis, establishing significance, stakeholders and vision, feasibility study; Operational phase—actions and contracts within defined time-frame; Assessment—monitoring and follow-up.
3. What are the primary sustainability processes being considered and assessed?	Sustainability†	Social—community equity, cohesion and wellbeing; Economic—economic sustainability, i.e., continued economic viability; Environmental—environmental sustainability, i.e., continued ecosystem viability.
4. What geographic trends can be identified?	Geographical scale	Local—single site to municipal; Regional—provincial to regional; National—nation-wide; International—continental to world.
	Country	Given by name.
	Continent	Given by name.
5. What is the coverage of each study?	Site no.	The number of sites studied.
6. What policy guidelines or legislation are referred to?	Policy reference	Given by name, institution and date; If a policy implementation instrument (e.g., the UNESCO World Heritage List) is named, then the implied relevant policy measure is cited (e.g., the UNESCO World Heritage Convention).

7. What kind of information is processed?	Empirical/theoretical	Empirical—based on observation and evidence; Theoretical—based on theoretical models, conjecture or uncited experience.
8. What research methods and instruments are used?	Method	Given by name.
9. Bias score	Bias	1 point for policy documents cited; 1 point for empiric data; total score 0–2.
10. How is historic garden management research distributed according to garden use? How does use affect the above-mentioned criteria?	Use	General—regards all historic gardens; Public—regards publicly managed and funded historic gardens that are freely accessible; Tourist—regards historic gardens that generate some revenue through entrance fees and visitor services; Private—regards historic gardens that are not generally accessible to the public and are primarily enjoyed by their owners.

*As defined by Cazzani et al., 2019.

†As defined by Dempsey et al., 2011.

4.3 Results

The studies in the systematic review include 30 research articles, 2 literature reviews, 12 conference papers and 6 book chapters. The specifics of each study can be found in Appendix A[2], where publications are divided by group, listed in chronological order, and briefly described according to this review's criteria.

The research articles and reviews are published in 20 different journals. Journals with more than 1 article on historic garden management include *Urban Forestry and Urban Greening* (4 articles); *Acta Horticulturae* (3 articles); *Englera* (2 articles); *Journal of Cultural Heritage* (2 articles); *Landscape and Urban Planning* (2 articles); *Landscape Research* (2 articles); *Ornamental Horticulture* (2 articles); *Sustainability* (2 articles). Many of these journals declare interdisciplinary aims and scopes (Journal of Cultural Heritage (JHC), n.d.; Landscape and Urban Planning, n.d.; Landscape Research Group, n.d.; Urban Forestry & Urban Greening, n.d.), indicating that historic garden studies are well suited to this kind of approach.

Conference proceedings that feature contributions more than once, in any year, include proceedings of the Italian Botanical Society, published in *Italian Botanist* (5 papers); proceedings of the International Society for Horticultural Science, published in *Acta Horticulturae* (2 papers); proceedings of the International Society of Photogrammetry and Remote Sensing, published in the *ISPRS Archives* (2 papers). While the first two venues

[2] See the online publication of this article at https://doi.org/10.3390/su122410679.

concerning botany and horticulture are expected, the multiple appearances of historic garden research in ISPRS conferences are interesting. The Society is dedicated to "information from imagery" (ISPRS, 2013), testifying to both the visual nature of historic gardens and the important role information acquisition and organization plays in their management.

As for book chapters, three of the six chapters are from *Gardens and Landscapes in Historic Building Conservation*, edited by Marion Harney (Harney, 2014a), while the remaining three are in different books. While the former is entirely dedicated to historic gardens, these other volumes address historic constructions (Alves et al., 2019), innovations in tourism studies (Silva & Carvalho, 2019), and cultural urban heritage studies (Obad Šćitaroci et al., 2019).

Whether academic journal, conference or book, all of these sources indicate a trend towards interdisciplinary research and younger research fields such as Landscape Studies, Urban Heritage and Tourism Studies. This should encourage historic garden scholars to look beyond their specific field and to connect their work to larger interdisciplinary issues. Not only would historic garden research gain greater exposure, but it would also become relevant to a wider audience.

The following sections discuss each of the research criteria individually. When necessary, conceptual criteria are specifically defined for this study. Then, the distribution of the studies by category is discussed. Finally, each criterion's section concludes with the main findings to emerge from its analysis. The last Section 4.3.10, goes most in-depth, revisiting each of the nine previously explored criteria according to garden use.

4.3.1 Supply vs. Demand Analysis

The studies are categorized according to supply or demand orientation. The difference between a supply or a demand-oriented study is determined based on whether reality is viewed from the garden owner/manager's perspective or from the visitor's perspective. Supply studies evaluate the gardens themselves as economic, cultural and environmental assets. Demand studies evaluate visitor needs/wants, characteristics, behavior, movement and spending as well as the non-use value attributed to the site by those who wish for the garden to exist, even if they don't visit (existence and bequest value). In this literature review: 41/50 studies are supply-oriented, 4/50 are demand-oriented, and 5/50 look at both supply and demand. The four studies focusing only on demand (Rostami et al., 2015; Saeed et al., 2017; Silva & Carvalho, 2019; Todt et al., 2008), and the five considering both (Askwith, 2009; Boisset, 1980; Gratani, 2006; Luz et al., 2018; Paiva et al., 2020) are particularly interested in the economic survival of historic gardens and understand that resources come from satisfied visitors in both public and private contexts. Rostami et al. (2015), Saeed et al. (2017) and Silva and Carvalho (Silva & Carvalho, 2019) use survey questionnaires in order to understand the profile, behavior and satisfaction of visitors. As De Oliveira Paiva, De Brito Sousa and Carcaud explain in their recent review, this form of inquiry is common in the field of Tourism and Leisure Studies when evaluating market segments and attractions (Paiva et al., 2020). Todt, Herder and Dabija (2008) discuss the economic impact of heritage conservation by citing global tourism board statistics. Other methodologies coming from the field of Resource Economics and Appraisal are presented by Askwith in her review (2009). In general, these seek to estimate the value of non-market public goods and compare that value to spending. Boisset (1980) also notes the public amenity value of historic gardens. Finally, both Gratani (2006) and Luz, Paiva, and Alves (Luz et al., 2018) make a point of including visitor information and attributed value in their case studies.

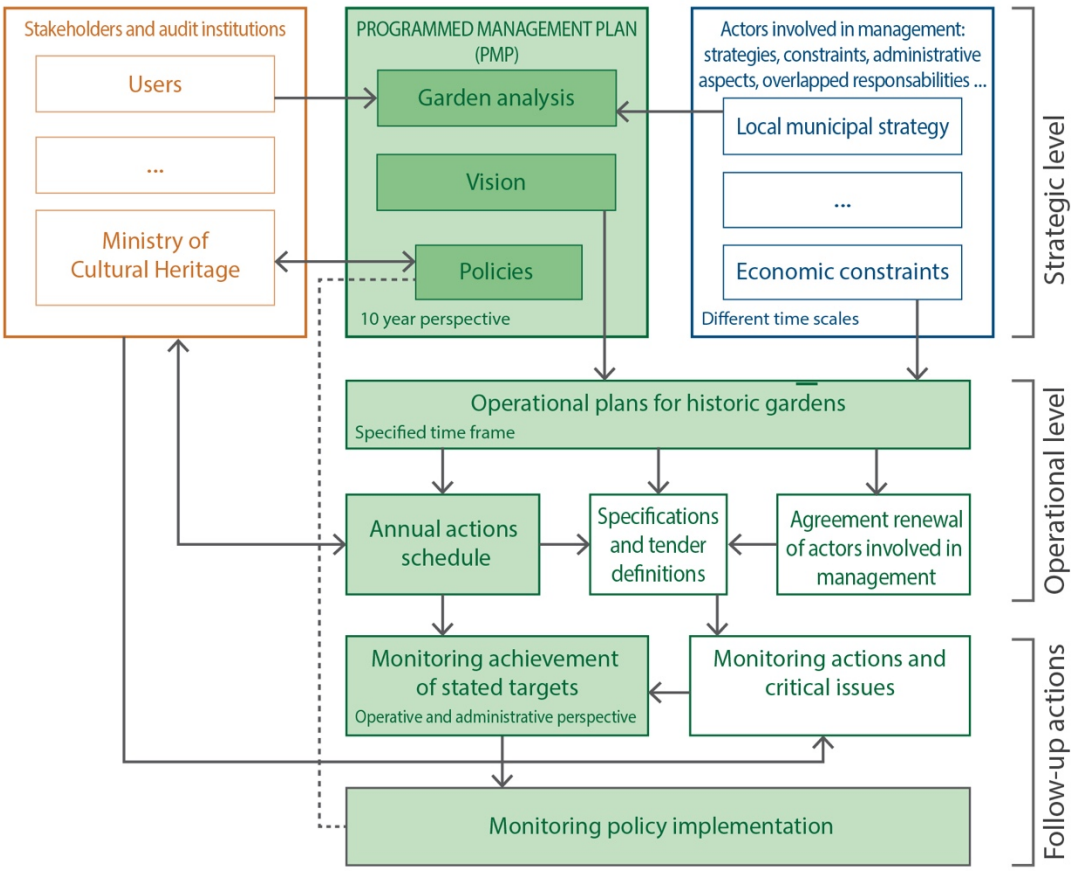
Grouping garden studies by supply vs. demand shows that the former is vastly favored. This may indicate that historic garden researchers are much more focused on the cause of protecting historic gardens themselves than on understanding the people who maintain, visit or value

them. However, an understanding of demand not only allows gardens to better attract and satisfy paying visitors, but it is also important in holding institutions and professionals accountable for their allocation of resources, efficiency in meeting objectives and equity in serving a diverse public. For these reasons, demand (often phrased as community value) is increasingly emphasized in heritage policy (Goetcheus & Mitchell, 2014) and should inform all historic garden conservation management plans.

4.3.2 Management Phase

Cazzani et al.'s management process flowchart (Figure 7) is used as a guide in separating the reviewed studies by management process. Cazzani et al. (2019) base their synthesis on the management processes and documentation required by UNESCO World Heritage Sites, The United States of America (USA) National Park Service, and the United Kingdom (UK)'s National Trust. Their vision of the management process is cyclical, moving from a strategic level to an operational level to an assessment level. At times, there is a fine line between the first phase and the last. When authors are proposing a new project, even hypothetically, their study is seen as strategic. When authors intend to evaluate what is already present, their work is categorized as an assessment.

Figure 7 - Flow Chart of the Decisional and Operational Aspects of the Management of a Historic Garden, Elaborated from Cazzani, Zerbi and Brumana (2019), p. 295.



In our literature review: 22/50 of the studies are categorized as involving the strategic phase; 4/50 are categorized as involving both the strategic and operational phases; 3/50 are classified as involving the operational phase; 21/50 are classified as involving the assessment phase.

Thus, this classification by management phase shows that the literature is split between the strategic phase and the assessment phase, with fewer operational management studies and combined strategic to operational phase studies. Both the strategic phase at the beginning of a project and the assessment phase at the end more easily lend themselves to research investigation. These are also often the phases where documentation is required by an outside institution, such as UNESCO for World Heritage Sites. However, the three articles that do treat the operational management phase all discuss an essential aspect of garden management: the too often overlooked role of skilled gardeners. Albericci's (2006) discussion of the lack of skilled gardeners and professional training in Italian University botanic gardens, Thoday's (2014) discussion of science and craft in garden management and Thorne's (Thorne, 2014) guide on contracts and costs in historic garden management all address this key aspect. This labor issue also appears in Pérez-Urrestarazu et al.'s study of water irrigation efficiency (2018) within the assessment management studies. In this case, the authors determine that a high number of people and work hours are dedicated to irrigation in their studied garden and hope to improve management and operation costs by implementing better planning and automation. Some studies also explicitly aim to help garden staff work more efficiently through better information management (Brine & Feather, 2010; Cazzani et al., 2019; Counsell, 2001; Malinverni et al., 2019) or by establishing clear protocols (Ciaffi et al., 2018).

4.3.3 Sustainability

Based on the European Landscape Convention's definition of landscape management as guiding and harmonizing social, economic, and environmental processes (European Landscape Convention, 2000), each study is classified by which of these processes is principally addressed. Social sustainability is defined as pertaining to community equity, cohesion and wellbeing, according to Dempsey et al., (2011). For simplicity's sake and conformity with the aforementioned Convention, this review includes cultural and political/institutional sustainability within social sustainability. However, it should be noted that some definitions of social sustainability separate these aspects (cf. Rostami et al., 2015 from this review as well as Burford et al., 2013; James & Magee, 2016; United Nations, 2015). A natural subdivision of social sustainability is particularly evident in the tourism garden category, discussed later. Definitions of economic and environmental sustainability are much less problematic. For this review's purposes, they are defined as the continued viability of the economic or environmental system supporting the studied historic garden(s).

In our literature review: 29/50 of studies primarily regard social sustainability; 5/50 of the studies primarily regard economic sustainability; 10/50 of the studies primarily regard environmental sustainability; 5/50 of the studies equally regard social and environmental sustainability; 1/50 of the studies equally regard economic and social sustainability.

According to this categorization of the reviewed studies, it seems that historic gardens make their most important contributions to social sustainability. Both social sustainability and the related subject of cultural ecosystem services are notoriously understudied, and the debate is still quite open on how to measure them (Cheng et al., 2019). In light of the predominance of social sustainability themes in the literature, historic gardens might provide an ideal laboratory. Indeed, many studies in this review value plants or plant communities as much or more for their socio-cultural value (Ciaffi et al., 2018; Gullino et al., 2010; Hansen et al., 2014; Kowarik & Wohlgemuth, 2006; Oishi, 2019) as for their environmental value. A fine line defines these

studies' primary sustainability interest; however, the authors often purposefully emphasize social sustainability importance over environmental sustainability importance.

Another important consideration to emerge from this categorization is the evident lack of articles regarding economic sustainability. As several authors have noted, almost all historic gardens struggle to make ends meet (Askwith, 2009; Brine & Feather, 2010; Meda & Rinaldi, 2006). Therefore, research that documents and analyzes the economic sustainability of historic gardens is vital. Finally, regarding environmental sustainability, the studies in this category mainly address historic gardens' roles in maintaining biodiversity. They show that historic gardens provide habitat for both important native species as well as the cultural relicts that have almost disappeared along with traditional agricultural landscapes (Arteaga et al., 2020; Prigioniero et al., 2021). The conservation of grassland/meadow species (Kowarik & Wohlgemuth, 2006; Kümmerling & Müller, 2012; Maurer et al., 2000) is found to be just as important as the conservation of tree species (Ciaffi et al., 2018; Gullino et al., 2010; Hansen et al., 2014). Two articles spoke about the water cycle (Cavagnero & Revelli, 2009; Pérez-Urrestarazu et al., 2018). Only one article spoke about historic gardens' impact on the urban climate (Oishi, 2019).

4.3.4 Geographic Distribution

Studies are classified by various geographic criteria, including the scale, country, and continent under investigation. In terms of scale: 22/50 of the studies are local; 6/50 of the studies are regional; 16/50 of the studies are national; 6/50 of the studies are international. Country classifications after the removal of international studies are shown in Table 3. As for continents: 33 studies regard Europe (plus 1 of the international studies); 8 are in Asia, 1 is in Africa, 1 is in North America, and 1 is in South America. Regarding the nationality of the literature, the top 5 represented countries are Italy with a significant lead (13/44), followed by Germany (5/44), Iran (4/44), the UK (4/44), and Portugal (3/44).

Table 3 - Distribution of Study Locations by Country

Country	No. studies	References
Italy	13	Albericci, 2006; Cappelletti, 2006; Cavagnero & Revelli, 2009; Cazzani et al., 2019; Ciaffi et al., 2018; Gratani, 2006; Gullino et al., 2020; Gullino et al., 2010; Malinverni et al., 2019; Meda & Rinaldi, 2006; Nascimbene & Salvadori, 2008; Prigioniero et al., 2021; Tisi, 2006;
Germany	5	Bergande & Marstein, 2013 Kowarik & Wohlgemuth, 2006 Krosigk, 1987; Kümmerling & Müller, 2012; Maurer et al., 2000;
Iran	4	Khalilnezhad, 2017; Mahdizadeh & Rajendran, 2019; Mahmood & Nasim, 2012; Rostami et al., 2015;
UK	4	Askwith, 2009; Boisset, 1980; Brine & Feather, 2010; Thorne, 2014;
Portugal	3	Alves et al., 2019; Arteaga et al., 2020; Silva & Carvalho, 2019;
Austria	1	Mang, 2013;
Brazil	1	Luz et al., 2018
Croatia	1	Obad Šćitaroci et al., 2019;
Denmark	1	Hansen et al., 2014;
Egypt	1	Abdel-Rahman, 2016;
France	1	Vissac, 2005;
India	1	Wahurwagh & Dongre, 2015;
Israel	1	Burmil, 2000;

Japan	1	Oishi, 2019;
Norway	1	Gao & Dietze-Schirdewahn, 2018;
Pakistan	1	Saeed et al., 2017;
Romania	1	Ionescu et al., 2010;
Spain	1	Pérez-Urrestarazu et al., 2018;
Sweden	1	Flinck, 2016;
USA	1	Halbrooks, 2005.

What emerges most in this category is a preference for local or national scaled studies and a growing amount of literature coming from outside Europe. Local studies are more easily carried out, especially since garden history scholars tend to be specialized in a particular geographic area. National scale studies have the advantage that they can be most easily compared to standardized tourism statistics. While various researchers cite Great Britain as a leader in historic garden conservation, it is interesting to observe that the UK does not dominate the literature review. It should be noted that this criterion is particularly influenced by the two databases selected for this review, Scopus and WoS. Although both include scientific journals from various geographic areas and in various languages, all indexed publications must meet each database's standards. Grey literature and smaller scientific journals are left out. Great Britain and other countries may appear less important in this review's ranking because more of their research is published in these unobserved sources. Furthermore, the chosen keywords' focus on historic gardens rather than historic estates in their entirety may influence the selection. In any case, it seems that a wider range of geographic regions is beginning to participate in historic garden research at an international level. As noted by Silva and Carvalho (2019), British data for garden tourism is often used as a benchmark in other contexts, without considering possible geographic or socio-cultural differences. In this respect, the contributions from Rostami et al. (2015), and Saeed et al. (2017) are particularly interesting because they show visitor profiles in a totally different cultural and climatic context, that of southwest Asia.

4.3.5 Site Coverage

Site coverage is defined as the number of locations treated in each study. If there are multiple sampling sites within one historic garden site, studies are categorized according to the garden sampling level. If the different sampling sites are spread out (e.g., throughout a city), each site is counted separately.

38/50 of the studies identify specific investigated sites. Although the number of sites per study ranged from 1 to 201, the majority of studies choose only a few locations (the median is 3). This is motivated by the large number of case studies in the literature and the large amount of time necessary to adequately investigate any historic garden. Case studies, in particular, must include a historical and current site analysis as preliminary steps, necessitating archival, botanical and architectural skills as well as time. Those studies with more than 10 sites (Abdel-Rahman, 2016; Brine & Feather, 2010; Gao & Dietze-Schirdewahn, 2018; Gullino et al., 2010; Kowarik & Wohlgemuth, 2006; Maurer et al., 2000; Meda & Rinaldi, 2006; Oishi, 2019) are all either field surveys or survey questionnaires. Although still quite time intensive, these research methods can more easily cover many sites. While case studies provide essential information for single projects, surveys with ample coverage are invaluable for establishing statistically valid benchmarks.

4.3.6 Historic Garden Policy - Guidelines and Legislation

As discussed in the introduction, there is a rich body of international policy governing the conservation of natural and cultural heritage that has evolved and changed since the 1960s. This includes the guiding documents, i.e., non-binding statements of best practices or intents, emanated by such international institutions as the UN, UNESCO and ICOMOS, or national bodies such as English Heritage or the USA National Park Service. It also includes binding international treaties and laws, which often protect historic gardens as a side effect while concentrating on other matters (especially heritage protection, environmental protection and humanitarian rights). The policy documents that were referenced or named in each study are listed and ranked in Table 4, so as to better understand the conservation principles and definitions guiding authors. National planning law has been lumped together, as an analysis of each country's specific legislation goes beyond the scope of this study. On the contrary, national guiding documents have been included, as they are also often referred to by studies outside their country of origin. Some studies cite multiple policy documents.

Table 4 - Policy Documents and Institutions Ranked by References

Policy document	Year	Institution	Publications
National planning and conservation law (no. = 13)	Various	Various	Alves et al., 2019 (Portugal); Askwith, 2009 (UK); Brine & Feather, 2010 (UK); Burmil, 2000 (Israel); Ciaffi et al., 2018 (Italy); Gao & Dietze-Schirdewahn, 2018 (Norway); Ionescu et al., 2010 (Romania); Krosigk, 1987 (Germany); Kümmerling & Müller, 2012 (Germany); Mahdizadeh & Rajendran, 2019 (Iran); Maurer et al., 2000 (Germany); Pérez-Urrestarazu et al., 2018 (Spain); Thorne, 2014 (UK);
Florence Charter (no. = 11)	1981	ICOMOS—the International Federation of Landscape Architects (IFLA)	Burmil, 2000; Paiva et al., 2020; Gullino et al., 2020; Hansen et al., 2014; Ionescu et al., 2010; Luz et al., 2018; Mahdizadeh & Rajendran, 2019; Malinverni et al., 2019; Obad Šćitaroci et al., 2019; Pérez-Urrestarazu et al., 2018; Silva & Carvalho, 2019;

World Heritage Convention (no. = 10)	1972	UNESCO	Askwith, 2009; Cappelletti, 2006; Cazzani et al., 2019; Paiva et al., 2020; Mahdizadeh & Rajendran, 2019; Maurer et al., 2000; Obad Šćitaroci et al., 2019; Pérez-Urrestarazu et al., 2018; Prigioniero et al., 2021; Todt et al., 2008;
Red List of Threatened Species (no. = 4)	1964-*	International Union for Conservation of Nature (IUCN)	Kowarik & Wohlgemuth, 2006; Kümmerling & Müller, 2012; Prigioniero et al., 2021; Rostami et al., 2015;
European Landscape Convention (no. = 3)	2000	Council of Europe	Gullino et al., 2020; Phillips, 2014; Rostami et al., 2015;
Venice Charter (no. = 3)	1964	ICOMOS	Burmil, 2000; Mahdizadeh & Rajendran, 2019; Todt et al., 2008;
World Heritage Convention Operational Guidelines (no. = 2)	1977- *	UNESCO	Cazzani et al., 2019; Obad Šćitaroci et al., 2019;
Stockholm Conference on the Human Environment (CHE)	1972	UN	Mahdizadeh & Rajendran, 2019;
Burra Charter	1979- *	Australia/ICOMOS	Gao & Dietze-Schirdewahn, 2018;
Brundtland report	1987	World Commission on Environment and Development (WCED)	Mahdizadeh & Rajendran, 2019;
Guide to Recording Historic Buildings	1990	ICOMOS/UK	Counsell, 2001;
Agenda 21	1992	UN	Mahdizadeh & Rajendran, 2019;
Habitat Directive	1992	European Commission	Kümmerling & Müller, 2012;
The Secretary of the Interior's standards for the treatment of historic properties: with guidelines for the treatment of cultural landscapes	1996	USA Department of the Interior	Halbrooks, 2005;

World Commission on Culture and Development (WCCD, 1996)	1996	WCCD	Mahdizadeh & Rajendran, 2019;
Eurogard	1997	Managing Historic Gardens Working Group Report	Cappelletti, 2006;
International Cultural Tourism Charter	1999	ICOMOS	Todt et al., 2008;
European Botanic Gardens Consortium	2000	Action Plan for Botanic Gardens in the European Union	Gratani, 2006;
Faro Convention	2005	Council of Europe	Gao & Dietze-Schirdewahn, 2018;
Millennium Ecosystem Assessment	2005	UN	Mahdizadeh & Rajendran, 2019;
Conservation Principles	2008	English Heritage	Gao & Dietze-Schirdewahn, 2018;
Carta de Juiz de Fora	2010	Brazil/ Instituto do Patrimônio Histórico e Artístico Nacional (IPHAN)	Luz et al., 2018
Historic Urban Landscape Recommendations	2011	UNESCO	Wahurwagh & Dongre, 2015;
People-Centered Approaches	2015	International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM)	Gao & Dietze-Schirdewahn, 2018.

* A hyphen (-) indicates a living document that continues to be periodically revised. The year before the hyphen indicates the year of the first edition of that document.

13/50 of the literature cites national planning and conservation laws. Indeed, national legislation has the most potential to protect or to expose historic gardens. The Florence Charter follows, with 11/50 citations. This is unsurprising because the Florence Charter is the first document to explicitly recognize historic gardens as cultural heritage and define the terms and objectives of their conservation. The World Heritage Convention is next, with 10/50 citations. This testifies to how important UNESCO is in promoting and conserving the heritage of universal value. In fact, many studies in this review are conducted at World Heritage sites. Furthermore, the World Heritage Operational Guidelines are separately cited as a guide for conservation management planning (Cazzani et al., 2019; Obad Šćitaroci et al., 2019), even for sites that are not part of the World Heritage List. It should be noted that some of the studies that do not refer to specific policy documents seem to have a working knowledge of conservation policy, demonstrated by the use of standard terms such as “fabric”, “heritage”, “historic”, “significance”, “integrity”, “interpretation” and “authenticity”. Because the understanding and interpretation of these terms change over time, relevant policy documents defining them should always be cited.

On the whole, the policy analysis shows that authors are critical of national planning and conservation policy's failure to sufficiently recognize and conserve historic gardens. Furthermore, the selection of commonly cited policy documents is much too narrow and dated in the reviewed literature. While the policy cited in the entire corpus is moderately comprehensive, only national planning and conservation law, the Florence Charter and the World Heritage Convention are cited more than 10 times. The remaining documents cited more than once were all emitted by the year 2000, while most of the important evolutions in policy regarding community involvement, sustainability and urban heritage occurred afterward.

4.3.7 Type of Information Analyzed

Publications are categorized by whether they are based on empirical or theoretical investigations. Empirical studies must be based on direct observation at a specified place and time. However, the information collected can be descriptive, qualitative or quantitative. Theoretical studies are those not based on direct experience at a specified place and time, i.e., if the authors are speaking from real-world experience, they do not specify when and where.

42/50 of the studies in this review are based on empirical observation, and 8/50 are theoretical discussions. This predominance of empirical studies is expected, as scientific journals generally reserve most of their pages for empirically based research. Theoretical discussions are all published before 2015, indicating that these early studies aimed to establish the underlying philosophy, terms, and best practices of historic garden management, paving the way for later empirical work.

4.3.8 Study Methods

Study methods used to research historic garden management are divided into the following general categories: case studies; biological field surveys; discussions; survey questionnaires or interviews; deoxyribonucleic acid (DNA) sequencing; policy analysis; review (in turn covering economic analysis and tourism statistics); hydraulic modeling; performance indicator analysis; geologic field survey. Each publication is classified by its primary study method in Table 5.

Table 5 - Study Methods Ranked by Number of Publications

Study method	No. studies	References
Case study	20	Abdel-Rahman, 2016; Alves et al., 2019; Bergande & Marstein, 2013; Burmil, 2000; Cappelletti, 2006; Cazzani et al., 2019; Counsell, 2001; Flinck, 2016; Gratani, 2006; Gullino et al., 2020; Halbrooks, 2005; Ionescu et al., 2010; Khalilnezhad, 2017; Luz et al., 2018; Mahmood & Nasim, 2012; Malinverni et al., 2019; Mang, 2013; Obad Šćitaroci et al., 2019; Tisi, 2006; Wahurwagh & Dongre, 2015;
Biological field survey	8	Arteaga et al., 2020; Gullino et al., 2010; Kowarik & Wohlgemuth, 2006; Kümmerling & Müller, 2012; Maurer et al., 2000; Nascimbene & Salvadori, 2008; Oishi, 2019; Prigioniero et al., 2021;
Discussion	7	Albericci, 2006; Boisset, 1980; Krosigk, 1987; Sales, 2000; Thoday, 2014; Thorne, 2014; Todt et al., 2008;
Survey questionnaire/interview	6	Brine & Feather, 2010; Gao & Dietze-Schirdewahn, 2018; Meda & Rinaldi, 2006; Rostami et al., 2015; Saeed et al., 2017;

		Silva & Carvalho, 2019;
DNA mapping	2	Ciaffi et al., 2018; Hansen et al., 2014;
Policy analysis	2	Mahdizadeh & Rajendran, 2019; Phillips, 2014;
Review of economic analysis	1	Askwith, 2009;
Review of tourism studies	1	Paiva et al., 2020;
Hydraulic modeling	1	Cavagnero & Revelli, 2009;
Performance indicators	1	Pérez-Urrestarazu et al., 2018;
Geologic field survey	1	Vissac, 2005

Case studies make up 20/50 of the literature, followed by biological field surveys (8/50), discussions (7/50), survey questionnaires or interviews (6/50), DNA sequencing (2/50), policy analysis (2/50), review of economic analysis (1/50), review of garden tourism (1/50), hydraulic modeling (1/50), performance indicator analysis (1/50), and geologic field survey (1/50).

Case studies are so predominant because they are the oldest research method to be commonly applied in historic garden management research and are a necessary first step in conservation management planning. Biological field surveys testify to the natural heritage component of historic gardens and their importance to biodiversity. Discussions are important in establishing deontology and key terms. Survey questionnaires show interest in understanding the human element of historic gardens. Visitor surveys and interviews analyze visitor demographics, behavior and satisfaction; owner/manager surveys investigate the motives and struggles of those dedicated to such an exhausting and generally unprofitable activity. No surveys are conducted on the gardeners themselves, although various authors lament that the lack of skilled plantsmen is a serious problem. DNA analysis is applied to identify and date the origin of monumental trees and understand the suitability of necessary replacements. Policy analysis takes a critical look at the political systems governing historic garden management, paying particular attention to its history, flaws and consequences. Reviews collect all of the approaches within a given topic, in this case, economic analysis and garden tourism, to analyze trends and gaps in research. Hydraulic modeling investigates water run-off through computer modeling. Performance indicator analysis evaluates labor efficiency. Geologic surveys use soil profile sampling to better understand a site (in this case, its garden history).

Askwith's review of economic analysis studies (Askwith, 2009) deserves special mention here because it presents important research methods from the fields of Resource Economics and Appraisal that cannot be found elsewhere in the reviewed literature. Askwith herself notes a lack of economic studies on historic gardens. She laments that most of the publications available are flawed or inconsistent grey literature. The few academic studies in her review that are indexed in Scopus present some economic appraisal techniques to evaluate the monetary value of non-market goods, specifically: measurement of the influence of trees on residential property values through before and after comparisons (Anderson & Cordell, 1988); appraisal of the recreational benefits provided by botanical gardens and national parks through the travel-cost method (Garrod et al., 1993; Liston-Heyes & Heyes, 1999); comparison of visitor number trends, admission prices and on-site spending in privately owned heritage estates (Markwell et al., 1997); appraisal of the value of urban amenities with a hedonic-pricing model (Powe et al., 1995); comparison of use and non-use value for a heritage site estimated through contingent valuation (visitor's willingness to pay for entry or to pay for preservation without entry) to

revenue from admission charges or to average visitor donation (Powe & Willis, 1996; Willis, 1994). As mentioned above in Section 4.3.1, the economic appraisal of the costs and benefits of historic gardens is not only important for improving the fragile economic sustainability of these public assets but also necessary to hold institutions accountable when they do not properly care for or provide these assets. Considering the importance of these aspects, it is surprising that this 1999 study was not followed by other economic assessment studies explicitly dedicated to historic gardens.

De Oliveira Paiva, De Brito Sousa, and Carcaud's (2020) review of tourism studies includes a wide range of work exploring the subject of garden tourism. The studies in their review that are indexed in Scopus provide several examples of garden tourism methodologies that can be fruitfully applied to historic gardens, including: on-site and frontier survey questionnaires and interviews to investigate garden owners (Connell, 2005), garden (Connell, 2004) or heritage (Kempiak et al., 2017; Poria et al., 2004) visitors and their experience; trip advisor review content analysis compared to the declared management objectives of botanical gardens (Catahan & Woodruffe-Burton, 2019); modeling of the tourist attraction system (Leiper, 1990); historical reconstruction through site visits, interviews, bibliographic and iconographic research (Garcia et al., 2017); discussions of pertinent themes such as the geography of gardens (Claval, 1989; Doolittle, 2004), the history of Iranian ornamental horticulture and historic gardens (Fallahi, 2017; Fallahi et al., 2020), and the evolving role of botanical gardens (Heywood, 2017; Krishnan & Novy, 2016; Powledge, 2011). Some of these research instruments are used in other studies in this historic garden management review, while some are new.

4.3.9 Bias Scores

Bias scores from 0–2 are attributed to each study based on the following system. One point is awarded if policy documents are found in a study in response to research question six; one point is awarded if a study is based on empirical data in response to research question seven. Classification by bias score is shown in Table 6. Obviously, such minimal criteria result in a wide range of studies within each class. However, this seems to be the only appropriate way to not favor or penalize one academic discipline over another. Some of these studies certainly do not intend to be free of bias, and it should be noted that this score does not reflect on the intellectual quality of the work. Furthermore, it should also be specified that any bias in question specifically regards a publication's treatment of historic gardens, without passing judgment on other items under investigation by the authors.

Table 6 - Bias Ratings for Reviewed Publications

Bias Score	No. Studies	References
0	4	Boisset, 1980; Sales, 2000; Albericci, 2006; Thoday, 2014;
1	19	Abdel-Rahman, 2016; Arteaga et al., 2020; Bergande & Marstein, 2013; Flinck, 2016;

		Gullino et al., 2010; Ionescu et al., 2010; Khalilnezhad, 2017; Krosigk, 1987; Mahmood & Nasim, 2012; Maurer et al., 2000; Meda & Rinaldi, 2006; Nascimbene & Salvadori, 2008; Oishi, 2019; Phillips, 2014; Saeed et al., 2017; Thorne, 2014; Tisi, 2006; Todt et al., 2008; Vissac, 2005;
2	27	Alves et al., 2019; Askwith, 2009; Brine & Feather, 2010; Burmil, 2000; Cappelletti, 2006; Cavagnero & Revelli, 2009; Cazzani et al., 2019; Ciaffi et al., 2018; Counsell, 2001; Paiva et al., 2020; Gao & Dietze-Schirdewahn, 2018; Gratani, 2006; Gullino et al., 2020; Halbrooks, 2005; Hansen et al., 2014; Kowarik & Wohlgemuth, 2006; Kümmerling & Müller, 2012; Luz et al., 2018; Malinverni et al., 2019; Mahdizadeh & Rajendran, 2019; Mang, 2013; Obad Šćitaroci et al., 2019; Pérez-Urrestarazu et al., 2018; Prigioniero et al., 2021; Rostami et al., 2015; Silva & Carvalho, 2019; Wahurwagh & Dongre, 2015

Regarding the distribution of bias scores: 27 publications are attributed 2 points, 19 are attributed 1 point, and 4 are attributed 0. These latter are written as essays, with no intention of being unbiased. The middle group contains a wide variety of publications, some of which are perfectly valid scientific studies but do not cite historic garden policy. In the context of this review, it is felt that heritage is inherently political. Thus, the highest-rated literature makes a point of basing their use of key terminology and procedure on specific policy documents.

4.3.10 Garden Use

In response to research question 10, the studies discussed in this section are divided into categories regarding general gardens, public gardens, tourist gardens and private gardens (Table 7). This division of the studies by garden use is adapted from Askwith (2009) and is further motivated by the repeated relevance given to use and access in other reviewed studies. "General" captures those publications that do not fit into the other more specific categories. "public" regards gardens that are pure public goods (they are non-rival and non-exclusive). Although they generate many benefits, these are mainly external to the market. Public gardens pay for their upkeep through public funding, which may constrict their hiring and contracting abilities. The third category, "tourist," regards gardens that directly generate revenue from entry tickets and complementary services (gift shops, cafés, special events). However, they also generate external benefits and can be financially supported by public funding, tax exemptions, private donations and sponsorship. They may be privately owned, with the use and care of the property relegated by national, regional and municipal regulations. Compliance can impose additional costs on owners; however, listed status can increase property values, allow owners to benefit from tax exemptions or grants and attract more visitors. These gardens may also be publicly owned, usually by national or regional rather than municipal entities. In Europe, there is an increasing trend of publicly owned heritage sites being managed by private enterprises (Towse, 2019). In this case, fixed costs may be covered by public expenditure, while variable costs are covered by the revenue generated through visitor services (Towse, 2019). The fourth category, "private", regards historic gardens that are primarily used for their owner's own enjoyment and are generally not open to the public. However, they still produce significant environmental, social and economic benefits for both the owner and the wider community.

Table 7 - Historic Garden Coverage by Use (General, Public, Tourist, Private)

Garden use	No. studies	References
General	13	Askwith, 2009; Boisset, 1980; Gullino et al., 2020; Khalilnezhad, 2017; Kowarik & Wohlgemuth, 2006; Krosigk, 1987; Mahdizadeh & Rajendran, 2019; Obad Šćitaroci et al., 2019; Phillips, 2014; Sales, 2000; Thoday, 2014; Thorne, 2014;

		Vissac, 2005;
Public	7	Abdel-Rahman, 2016; Cazzani et al., 2019; Ionescu et al., 2010; Luz et al., 2018; Maurer et al., 2000; Rostami et al., 2015; Wahurwagh & Dongre, 2015;
Tourist	27	Albericci, 2006; Alves et al., 2019; Arteaga et al., 2020; Bergande & Marstein, 2013; Brine & Feather, 2010; Burmil, 2000; Cappelletti, 2006; Cavagnero & Revelli, 2009; Ciaffi et al., 2018; Counsell, 2001; Paiva et al., 2020; Gratani, 2006; Halbrooks, 2005; Hansen et al., 2014; Kümmerling & Müller, 2012; Mahmood & Nasim, 2012; Malinverni et al., 2019; Mang, 2013; Meda & Rinaldi, 2006; Nascimbene & Salvadori, 2008; Oishi, 2019; Pérez-Urrestarazu et al., 2018; Prigioniero et al., 2021; Saeed et al., 2017; Silva & Carvalho, 2019; Tisi, 2006; Todt et al., 2008;
Private	3	Flinck, 2016; Gao & Dietze-Schirdewahn, 2018; Gullino et al., 2010

Table 8 compares the four historic garden use categories according to the other research criteria. The composition by category is also given for the entire corpus of the literature review. The distinguishing characteristics of each group are discussed in the following four subsections.

Table 8 - Literature Characteristics by Use (General, Public, Tourist, Private) [*†]

Use	General	Public	Tourist	Private	Total in review
% Total	26.00%	14.00%	54.00%	6.00%	100.00%
Supply/ demand	84.6% sup.	71.4% sup.	81.5% sup.	100.0% sup.	82.0% sup.
	0.0% dem.	14.3% dem.	11.1% dem.	0.0% dem.	8.0% dem.
	15.4% both	14.3% both	7.4% both	0.0% both	10.0% both
Management phase	61.5% strat.	57.1% strat.	33.3% strat.	33.3% strat.	44.0% strat.
	15.4% oper.	0.0% oper.	3.7% oper.	0.0% oper.	6.0% oper.
	7.7% ass.	42.9% ass.	55.6% ass.	66.7% ass.	42.0% ass.
	15.4% combo	0.0% combo	7.4% combo	0.0% combo	8.0% combo
Sustainability	69.2% soc.	71.4% soc.	48.1% soc.	66.7% soc.	58.0% soc.
	15.4% econ.	0.0% econ.	11.1% econ.	0.0% econ.	10.0% econ.
	15.4% env.	14.3% env.	25.9% env.	0.0% env.	20.0% env.
	0.0% combo	14.3% combo	14.8% combo	33.3% combo	12.0% combo
Geographic scale	7.7% loc.	57.1% loc.	59.3% loc.	33.3% loc.	44.0% loc.
	15.4% reg.	14.3% reg.	7.4% reg.	33.3% reg.	12.0% reg.
	53.8% nat.	28.6% nat.	22.2% nat.	33.3% nat.	32.0% nat.
	23.1% inter.	0.0% inter.	11.1% inter.	0.0% inter.	12.0% inter.
% Explicit sites	38.5% yes	86.0% yes	88.9% yes	100.0% yes	76.0% yes
	61.5% no	14.0% no	11.1% no	0.0% no	24.0% no
% Explicit policy references	61.5% yes	85.7% yes	66.7% yes	33.3% yes	66.0% yes
	38.5% no	14.3% no	33.3% no	66.7% no	34.0% no
Empirical/theoretical	53.8% emp.	100.0% emp.	92.6% emp.	100.0% emp.	84.0% emp.
	46.2% theo.	0.0% theo.	7.4% theo.	0.0% theo.	16.0% theo.
Method	Discussion (38.5%)	Case study (71.4%)	Case study (40.7%)	Biological field survey (33.3%), Case study (33.3%), Survey questionnaire (33.3%)	Case study (40.0%)
Bias	23.1% = 0	0.0% = 0	3.7% = 0	0.0% = 0	8.0% = 0
	38.5% = 1	42.9% = 1	33.3% = 1	33.3% = 1	38.0% = 1
	38.5% = 2	57.1% = 2	63.0% = 2	66.7% = 2	54.0% = 2

[*] Abbreviations: sup. (supply); dem. (demand); strat. (strategic); oper. (operational); ass. (assessment); soc. (social); econ. (economic); env. (environmental); loc. (local); reg. (regional); nat. (national); inter. (international); emp. (empirical); theo. (theoretical).

[†] Percentages are rounded off to the nearest decimal, and thus sometimes do not total up to exactly 100%.

4.3.10.1 General Gardens

13/50 of the publications in this review are general, regarding all types of historic gardens. This category shows the strongest tendency towards a supply orientation and focuses on the strategic management phase. It also has the broadest geographic scale, the fewest studies with explicit sites, the fewest empirically based studies and the lowest average bias score (1.4). In fact, six of the nine theoretical studies come from the general garden category. The main research method employed is discussion.

Authors such as Boisset (1980), Sales (2000), Thoday (2014), and Thorne (2014) all discuss the best practices of historic garden management and seem to address their work towards professionals rather than academics. All but Thorne (who mentions planning and conservation laws) receive a 0 because they neither cite policy documents nor base their study on empirical investigation. Indeed, their aim is not to be unbiased, but instead to transmit their experience and views efficiently to the harried workers keeping historic gardens afloat. Krosigk (1987), Phillips (2014), and Mahdizadeh and Rajendran (2019) all focus on the evolution of the policy governing historic garden conservation. The latter work is particularly interesting because the authors address a politically turbulent area (Iran), where gardens are conserved or destroyed according to reigning political ideologies. Indeed, this work demonstrates that one must not take public policy for granted, but critically evaluate the efficiency and even the motives of political institutions. Public choice theory, i.e., the economic study of public policy that admits that government officials and bureaucrats act according to "personal objectives in collective decision making, just as they do in the market" (Mazza, 2002), has been used to understand heritage preservation policy (Rizzo & Towse, 2002; Towse, 2019) and would doubtless prove insightful if applied to historic garden policy as well. Askwith (2009) offers an overview of the economic impact of historic gardens in the United Kingdom through a literature review. Vissac (2005), Kowarik and Wohlgemuth (2006) and Gullino, Devecchi and Larcher (2020) all use historic gardens as living laboratories where historical research is combined with geologic or biologic site analysis to investigate the evolving landscape. Khalilnezhad (2017) and Obad Šćitaroci et al. (2019) seek to identify architectural–historic garden typologies and renewal models.

Seen together, it is evident that the studies in the general gardens category most explicitly address the nature and value of historic gardens, taking a panoramic perspective. Many of these studies are in the form of essays or discussions or best practice overviews for professionals. The most informative studies in this category see historic gardens as embedded in a larger social, economic and environmental system and use precise empirical methods to measure that embeddedness: policy analysis for social systems, market analysis and valuation for economic systems, site surveys for environmental systems.

4.3.10.2 Public Gardens

With only 7/50 examples, the public historic garden category is quite under-represented. This is surprising, considering how important historic green spaces in urban areas are, with many coming from the internationally spanning 19th century Parks Movement. Furthermore, policy documents such as the UN Sustainability Goals (United Nations, 2015a) and the UNESCO's Historic Urban Landscape Recommendations (UNESCO, 2011) puts great emphasis on the importance of both green spaces and cultural heritage in the city. One can only surmise that public spaces are the most difficult to obtain visitor and financial information for and perhaps the least glamorous for researchers. Nonetheless, all studies in this category are empiric investigations, with the case study method predominating. No study in the group has a bias score of 0, and the category average is 1.49.

Of all the use categories, public gardens show the largest percentage (14.3%) dedicated to demand (although the small size of the category makes all of the percentages for this category indicative and not statistically robust). Demand analysis should be an important part of public historic garden management because they are paid for through taxation with the intention of increasing public welfare. Rostami et al. (2015) analyze demand by surveying visitors in four Persian gardens and, to a limited extent by Luz, Paiva and Alves (Luz et al., 2018), by interviewing visitors as part of a site evaluation in Brazil. Public garden studies show the most interest in strategic management (57.1%), followed by assessment (42.9%). Of all of the categories, they show the highest interest in social sustainability (71.4%). An important characteristic defining public garden studies relate to their public good quality; they should investigate specific politically defined territories so that results reflect on responsible governing institutions and their allocation of resources and efficiency. Cazzani, Zerbi and Brumana (2019) point out that many public historic gardens were originally designed as private residences and describe how this change of management affects garden conservation. All but two studies in this category investigate a clearly delimited geo-political area: Maurer, Peschel and Schmitz (2000) survey different land-use types in the capital city of Berlin, Germany; Ionescu, Iliescu and Dumitrascu (2010) catalog historic garden sites in the capital city of Bucharest, Romania; Rostami et al. (2015) investigate representative historic gardens in Iran; Wahurwagh and Dongre (2015) evaluate the cultural landscape conservation of the metropolitan area of Burhanpur, India; Abdel-Rahman catalogs overlooked historic parks in the capital city of Cairo, Egypt (2016).

The geographic diversity of these studies is also noteworthy, with four coming from outside Europe (Abdel-Rahman, 2016; Luz et al., 2018; Rostami et al., 2015; Wahurwagh & Dongre, 2015). The availability of public parks is an important indicator of wellbeing. Interest and demand for them may be correlated with development trends in these areas, including rising standards of living, education, and leisure time. Because public gardens are government-managed, policy is particularly important for this category. In fact, all but one of the studies cites specific policy documents. These include national planning and conservation law; the World Heritage Convention; the World Heritage Convention Operational guidelines; the Florence Charter, the Red List of Threatened Species; the European Landscape Convention; the Historic Urban Landscape Recommendations; and the Carta de Juiz de Fora (the Brazilian Historic Garden Charter). Surprisingly, the 2017 ICOMOS-IFLA Document on Historic Urban Public Parks (ICOMOS-IFLA, 2017) is not mentioned. This document specifically addresses historic public gardens and should be considered in future studies.

What emerges most in the analysis of this historic garden category is the pure public good nature of public historic gardens. The most successful studies in this category evaluate governments' management of historic gardens to increase citizens' welfare. They achieve this by being situated in defined geopolitical territories, documenting the governing body in question's policy, and analyzing the community's demand and value for historic gardens.

4.3.10.3 Tourist Gardens

Classifying the gardens by use shows that the majority (27/50) of historic garden research regards tourist gardens. This is unsurprising since tourist gardens are more well-known and automatically generate visitor and financial information through ticket sales. In fact, this category of garden use contains the majority of studies involving the assessment phase of management (15/27). This might imply that these gardens are particularly motivated to manage their resources efficiently because they are economic ventures (generally small to medium businesses). Furthermore, they are often accountable to national and international bodies and

must also demonstrate their commitment to objectives other than profit, such as public outreach and environmental or cultural heritage conservation. This category contains all but one of this literature review's demand-oriented studies, with Todt, Herder and Dabija (2008) offering a discussion of the role of monument protection in tourism; Saeed et al. (2017) performing a case study of visitor satisfaction in three Moghul Gardens in Pakistan; Silva and Carvalho (Silva & Carvalho, 2019) profiling historic garden visitors in Portugal and comparing their data to similar studies performed in the United Kingdom. In addition, Gratani (2006) and De Oliveira Paiva, De Brito Sousa and Carcaud (2020) compare both supply and demand in the Rome Botanical Garden (Rome, Italy) and in the international garden tourism market, respectively.

Most of these studies are interested in social sustainability, just as in all of the other user categories. However, this is the only category where this percentage is less than half (48.1%). In the earlier years of historic garden management studies, publications regarding social sustainability in the tourist garden category appear that are interested in problems of conserving the fabric (i.e., material composition) of cultural heritage: Burmil (2000) discusses conservation treatments of the Ramat Hanadiv memorial gardens in Israel; Counsell (2001) inventories three European case studies using spatial information systems to store and access information; Halbrooks (2005) documents the restoration of the English Garden at Stan Hywet Hall (USA); Cappelletti (2006) discusses the Padua Botanic Gardens (Italy), Nascimbene and Salvadori (2008) investigate restorative cleaning practices of limestone statues in Venetian villas (Italy); Mahmood and Nasim (2012) propose a reconstruction of a historic Persian garden in Bojnourd (Iran); Mang (2013) documents the care of the Austrian Federal Gardens (Austria); Alves et al. (2019) document the restoration of an 18th century bridge within the Queluz National Palace Gardens (Portugal); Malinverni, Chiappini and Pierdicca (2019) use geographic information systems (GIS) to catalogue the living and non-living fabric of Villa Bounaccorsi's historic garden (Italy). More recently, social sustainability studies in the tourist garden category have begun to look beyond the physical fabric of cultural heritage and also investigate intangible social value: Tisi (2006) describes educational, and public outreach activities in Trentino (Italy); Brine and Feather (2010) look at the motives and struggles of heritage property owners in the UK; Saeed et al. (2017) and Silva and Carvalho's (2019) previously mentioned visitor studies implicitly evaluate equity by collecting demographic statistics on the visitors who access and benefit from the historic gardens in question. It is also interesting to note that three of the literature review's five economic sustainability articles are from the tourist garden category. Todt et al. (2008) and De Oliveira Paiva, De Brita Sousa and Carcaud (2020) examine the economic implications of historic garden tourism, and Meda and Rinaldi (2006) analyze the particular funding and labor problems of Italian University Botanical Gardens.

Of all the use categories, tourist garden studies show the highest interest in environmental sustainability (25.9%). Most of these studies are particularly interested in historic gardens' role in conserving biodiversity: Kümmerling and Müller (2012) investigate the relationship between landscape design style and conservation value in a UNESCO world heritage site (Germany); Bergande and Markstein (2013) discuss a preservation and management plan for the Berlin-Dahlem Botanic Garden that specifically aims to conserve biodiversity (Germany); Arteaga et al. (2020) investigate arthropod diversity in historic gardens in the Azores archipelago (Portugal); Prigioniero et al. (2021) investigate the conservation of biodiversity in the Giardino Inglese at the Reggio di Caserta (Italy). Other sustainability issues are addressed by Cavagnero and Revelli's article on water run-off control within the Racconigi Royal Park (Italy) using hydraulic modeling (Cavagnero & Revelli, 2009); Pérez-Urrestarazu et al.'s article on water management within the Real Alcazar gardens (Spain) (Pérez-Urrestarazu et al., 2018); Oishi's article on the urban heat island's effect on traditional Japanese moss gardens (Oishi, 2019).

Three studies are interested in the relationship between social and environmental sustainability, with Albericci (2006) investigating the relationship between biodiversity conservation and public education at the Botanical Garden of Rome (Italy); Hansen, Thomson and Rasmussen (2014) investigating the genetic profile of historic lime tree plantings in the Royal Danish Gardens (Denmark); Ciaffi et al. (2018) investigating the conservation of historic plane trees in Villa Lante (Italy). The second two are noteworthy because they attribute a primarily social value to historic trees, rather than an environmental value.

In terms of geographic scale, this group has the highest percentage of local studies (59.3%). This is because many of these studies either concentrate on a specific garden or a group of gardens in the same city. In fact, almost all studies (88.9%) investigate specific sites and are based on empiric research (92.6%). The tourism garden category follows the same distribution in policy document citation as the whole literature corpus, with 2/3 explicitly citing policy and 1/3 not citing policy. The main research method in this category is the case study (40.7%), followed by the biological field survey (18.5%) and the survey questionnaire (14.8%). The category's average bias score is 1.5.

Aside from the research criteria, an unexpected trend to emerge in the tourist garden category is the appearance of several botanical gardens. Indeed, both Askwith (2009), Silva and Carvalho (2019) and De Oliveira Paiva, De Brita Sousa and Carcaud (2020) use botanical gardens to estimate the historic garden tourism market because they keep precise visitor and financial records, are among the most marketed garden attractions and are sometimes even included as a category (with zoos) in tourism-board statistics (Silva & Carvalho, 2019). Of course, a botanical garden is not necessarily a historic garden. Botanical Gardens Conservation International defines botanical gardens as "institutions holding documented collections of living plants for the purpose of scientific research, conservation, display and education" (BGCI, 2019). Tisi (2006) and Gratani (2006) discuss Botanical Garden educational activities, while Arteaga et al.'s study of the Faial Botanical Garden in Portugal (2020) provides an example of scientific research. While new botanical gardens can be built at any time to fulfill their mission, historic botanical gardens bear a double responsibility of carrying out the aforementioned mandates while also preserving their heritage value. Cappelletti (2006) and Bergande and Markstein (2013) describe how management planning has tried to deal with both missions in Padova and Berlin. Albericci (2006) and Meda and Rinaldi (2006) show that despite being the "best publicized gardens" (Silva & Carvalho, 2019), botanical gardens have serious problems with labor and with financial resources.

What emerges most in this category is the importance of the non-monetary mandates of these gardens. Although tourism gardens are economic businesses, their income is only a means to fulfill other goals. These mandates are determined both by the individual owner/managers and by outside stakeholders. The sustainability criterion is particularly useful in drawing out the different possible mandates of tourist historic gardens. Tourist garden studies also most clearly show social sustainability falling between two groups: studies concerned with the tangible heritage value of the gardens in question and studies concerned with the intangible benefits that motivate both visitors and owners to spend their time and money on historic gardens.

4.3.10.4 Private Gardens

Although private gardens are only represented by three studies in this review, they shed light on some interesting issues. Gullino, Larcher and Devecchi (2010) illustrate their role in conserving monumental trees; Flinck (2016) shows how private historic gardens create neighborhood identity and amenity value; Gao and Dietze-Schirdewahn (2018) investigate how private gardens conserve intangible cultural heritage. Outside this category, both Askwith

(2009) and Silva and Carvalho (2019) note a connection between owning a garden and garden visitation in the UK. They also note that owners of private historic gardens are more likely to participate in garden clubs and associations and in garden tourism. All three studies are supply-oriented; one is dedicated to strategic management and two are dedicated to assessment; two regard social sustainability while one looks at both social and environmental sustainability equally; the studies are evenly split between local, regional and national scales; all identify sites; two cite policy documents; all are empirically based; research methods are split between biological field survey, case study, and survey questionnaire; the average bias rating is 1.67. While not much can be surmised based on the statistics of only three studies, this category certainly shows much potential for future research. The issue of intangible cultural heritage preserved through every-day life seems the most promising aspect to emerge here.

4.4 Discussion

This review set out to collect the many different threads of multidisciplinary research investigating historic garden management in order to arrive at a comprehensive vision of the subject, evaluate its progress, and give indications for future development. With these aims, the body of interdisciplinary literature available in two leading scientific databases has been categorized according to 10 research criteria. In this last section, the larger ramifications of these findings are discussed, and gaps in the literature are identified. Particular attention is paid to the changing conceptual foundations of policy and practice and the gap between the two; the community and stakeholders as protagonists of historic garden management; the social, economic and environmental sustainability of historic gardens; the emergence of previously unrepresented cultures and regions; the diversifying methodologies and interdisciplinary approaches being applied in the subject. Some studies from outside of the reviewed literature are also cited in this section as suggested examples of promising empiric methods and directions.

4.4.1 Changing Conceptual Frameworks in Policy and in Practice

The literature in this review dates back to the 1980s when historic gardens were first recognized as heritage. Over these past four decades, both the ideologic foundations and the methodological instruments of historic garden management have evolved and grown in scope and complexity. The policy and professional deontology guiding historic garden management has gone from preserving “living monuments” (ICOMOS-IFLA, 1982) in the Florence Charter to managing dynamic landscapes in the European Landscape Convention (2000). This second approach is better equipped to recognize intangible heritage values, involve the community in heritage identification and management, and prioritize sustainability. However, a significant gap still remains between the ideal vision laid out in policy documents and what is actually achieved in practice. Not unaware, the academic community has sought to better understand and improve historic garden management, with each discipline proposing its own specialized methodologies and research tools. However, as this review has shown, research is not always based on an updated understanding of conservation thought.

When ICOMOS and IFLA jointly ratified the Florence Charter in 1982 (ICOMOS-IFLA, 1982), they officially added historic gardens to those heritage monuments and sites codified by the ICOMOS Venice Charter of 1964 (ICOMOS, 1964). The Florence Charter prioritized the identification and listing of historic gardens by trained experts. Thus, in the earlier years of historic garden research, the academic community was principally concerned with these tasks, as well as the possible actions (maintenance, conservation, restoration and reconstruction) admitted by the charter. In this literature review, the Florence Charter continues to be the most

cited policy document. However, its influence is not always positive. While the Florence Charter represents an important advancement in heritage conservation, it is limiting if not complemented by other, more recent, documents in the heritage conservation canon.

Another important evolution in heritage policy is an increasing shift away from aiming to maintain historic gardens as unchanged as possible (ICOMOS-IFLA, 1982) towards managing change for sustainable development (European Landscape Convention, 2000). The former puts the most emphasis on one-time restoration projects carried out by experts and minimally considers management and upkeep. The latter puts the most emphasis on conservation management planning, where stakeholders (including experts, owner/managers and the community) guide both extraordinary and routine works. In order to aid both expert and non-expert stakeholders, policy is increasingly accompanied by operational guidelines such as those discussed by Cazzani et al. (2019), which break down the complicated conservation management process into a cyclical series of strategic, operational and assessment phases. The effective difference such a tool makes can be seen in a comparison between Burmil's (2000) and Halbrook's (2005) case studies. While the former is not equipped by the Florence Charter to deal with change in the garden, the latter has a set of protocols provided by the US Ministry of the Interior's Guidelines (Birnbaum & Madigan, 1996) to confidently navigate the same kinds of problems. Furthermore, a conservation management view allows authors to define the management phase that they are addressing, without having to definitely resolve every problem. Indeed, given the scope and complexity of historic garden management, the latter would be impossible. Instead, operational guidelines focus on decision-making tools that can help prioritize the allocation of limited resources in a defined timeframe. Afterward, progress is assessed, and the cycle begins again.

The literature unequivocally showed that the principles of international guiding documents are most often not reflected in national, regional and municipal planning policy. At best, local authorities are adopting earlier policies such as the Florence Charter and focusing their attention on measures that protect listed gardens from development. While such efforts keep gardens from disappearing, they do not help gardens thrive. While the literature describes the problem, it does not find solutions. More pragmatic policy analysis is necessary that denounces less and investigates more. Public choice theory and other political economy approaches would be useful in better understanding the hows and whys of policy success and failure.

4.4.2 Community Members and Stakeholders as the New Protagonists in Historic Garden Management

Like the Athens and Venice Charter, the Florence Charter was concerned with identifying and saving monuments based on expert-attributed merit and did not see the public as stewards or stakeholders. With 82% of the literature in this review dedicated to describing the gardens themselves, i.e., supply, it is clear that the academic community embraced this role. However, around the same time that the Florence Charter was written, ICOMOS, as well as other bodies such as UNESCO, began to see experts as facilitators and not gatekeepers. Instead of deciding the value of heritage by themselves, they were given the responsibility of gauging the community's value for heritage sites and helping them care for them. This development was inspired by a recognition of the significance attributed to heritage by native peoples in documents such as the 1979 Australian ICOMOS Burra Charter (Australia/ICOMOS, 1979) and the 2004 US/ICOMOS Natchitoches Declaration on Heritage Landscapes (US/ICOMOS, 2004), as well as a desire to contrast globalization and the oppression of ethnic minorities in the 1994 ICOMOS Nara document (ICOMOS, 1994). As the European Union formed and sought a collective identity, it also played a leading role in recognizing historic urban areas and

cultural landscapes as heritage assets, contributing to guiding documents such as the 2012 ICOMOS Valletta Principles (ICOMOS General Assembly, 2011); the 2011 UNESCO Recommendations on the Historic Urban Landscape (UNESCO, 2011); the 2014 ICOMOS Declaration on Heritage and Landscape as Human Values (ICOMOS, 2014). These documents place the same primacy on community-attributed value and stewardship as those mentioned above. Legislation such as the UNESCO World Heritage Convention and the European Landscape Convention also incorporated a community-based attribution of significance, integrity and authenticity.

With policy documents universally calling for community involvement, the lack of research addressing this aspect is glaring. In this review, those studies that pay the most attention to community value and stewardship are categorized as demand (Boisset, 1980; Saeed et al., 2017; Silva & Carvalho, 2019; Todt et al., 2008) or both supply and demand research (Askwith, 2009; Boisset, 1980; Gratani, 2006; Luz et al., 2018; Paiva et al., 2020). These studies use methodologies from the social sciences, such as survey questionnaires and interviews and economic appraisal techniques to investigate the community-attributed value of historic gardens. De Oliveira Paiva, De Brita Sousa and Carcaud (2020) and Silva and Carvalho (2019) give comprehensive presentations of research carried out within the field of Tourism Studies, while Askwith (2009) provides various examples of economic appraisal methods. One might imagine that demand research has not been addressed much because historic garden scholars tend to come from Landscape or Cultural Heritage backgrounds. However, both Rostami et al. (2015), from Engineering, Architecture and Built Environment, and Saeed et al. (2017), from Agricultural Science, are both able to go outside the traditional confines of their discipline and conduct informative visitor surveys demonstrating the social and psychophysical benefits perceived by garden visitors and the wider community. The former also conduct a very thorough review of the literature evaluating the health and wellbeing benefits provided by urban nature and the social benefits provided by cultural heritage.

There are still many gaps in the literature regarding the demand-oriented study and community value of historic gardens. Monetary and non-monetary landscape appraisal methods are not being used, even though they have been developed for just this purpose (Tempesta, 2014, 2016). These methods analyze demand through stated and revealed preference methods to estimate consumer surplus and quantify the positive externalities provided by non-market and public goods. Askwith's review gives a small but dated sample of these techniques. Today, they are commonly applied in the fields of Environmental, Ecological and Cultural Economics and Landscape Valuation, with many pertinent examples to be found.

Another important aspect of community value that is not addressed in the reviewed literature is equity. While there are many documented social benefits provided by historic gardens (Rostami et al., 2015) that justify their support with public funding, studies have also repeatedly shown that historic garden visitors are predominantly wealthy, well-educated, older and female (Connell, 2004; Paiva et al., 2020; Silva & Carvalho, 2019). When confronting a similar problem in the arts, many cultural economists argue that culture is a merit good, i.e., a good that is more highly valued by society than by individual consumers because the latter are not fully able to understand its worth (Towse, 2019). Both public and private expenditures on merit goods are motivated by altruism as well as a desire to improve one's own situation by improving community welfare (Towse, 2019). Public resources are typically also spent on outreach to educate the public to increase their demand for those goods that increase their welfare, often focusing on the young and disadvantaged. Differentiated pricing also serves to lower the cost of merit goods to what consumer segments are willing to pay. Studies conducted on "plant blindness" (Balding & Williams, 2016; Sanders et al., 2018) imply that education and outreach greatly impact visitors' appreciation and demand for nature experiences.

In heritage policy and practice, this outreach is called “interpretation”. Some forms of interpretation common in cultural and natural heritage sites include signage, brochures, leaflets, exhibitions, visual displays, smell or touch stations, written or audio self-guided itineraries, expert-led guided walks, and interactive digital or web-based technology, among others. In this review, interpretation is considered by Counsell (2001), who reviews some literature and guidelines on the subject and seeks to streamline the process from information recording to primary interpretation to secondary interpretation. However, much more could be done, especially regarding the effectiveness of interpretation in raising community attributed value or willingness to pay for historic gardens.

Internal stakeholders also merit attention as important members of the community. More than any other, the operational management phase regards the day-to-day struggles of garden owners, managers, gardeners and other staff. The lack of operational management research in the reviewed literature reveals that scholars maintain an expert-centered rather than stakeholder-centered focus. Any research truly interested in the sustainability of historic gardens must concern itself with those working to keep historic gardens afloat. As Brine and Feather (2010) point out, the owners and managers of historic gardens are primarily motivated by a desire to conserve their property for future generations and share it with visitors, and not by profit. Indeed, as shown by Askwith (2009), and Meda and Rinaldi (2006), they are rarely able to make ends meet. Some authors hope to help historic garden staff work more efficiently with spatial information acquisition and management systems (Cazzani et al., 2019; Counsell, 2001; Malinverni et al., 2019). However, as Brine and Feather note, most heritage managers do not have the time or the technical skills necessary to learn to use these systems. Furthermore, they are not inclined to sit behind a computer and spend most of their workday in the field. However, smartphones may make data acquisition, compilation and retrieval increasingly accessible in the field, and a younger, more technology-savvy generation may be better equipped to use this technology. Other efforts made in the literature to improve efficiency are more immediately accessible, such as automated irrigation (Pérez-Urrestarazu et al., 2018) and the use of standard management protocols (Ciaffi et al., 2018).

Adequate staffing also emerges in the review as a significant problem, with Boisset (1980), Sales (2000), Thoday (2014), and Albericci (2006) all asserting that a well-trained, motivated, and adequately supplied gardening staff is the essential factor in historic garden management. Given that the same authors also identify a constantly worsening trend in this department, scholars must step up to fill the gap regarding historic garden staff. Research must better understand who is caring for our historic gardens and must find ways to requalify the figure of the skilled gardener in order to attract younger generations. The role of the media and garden celebrities has also not been investigated. Could the media contribute to making the professional figure of the master gardener relevant and respected? The profession of the chef, which is similar in many ways, was also once considered menial but is now attracting increasing attention and prestige thanks to mediatic attention (Zopiatis & Melanthiou, 2019).

4.4.3 Sustainability of Historic Gardens

Created by the combined forces of man and nature and necessitating continual resources to survive, historic gardens represent a perfect union of the social, economic and economic pillars of sustainability. In light of this and the increasing relevance is given to sustainability by such heritage policy documents as the European Landscape Convention and the UN Sustainable Development Goals, the literature in this review is categorized according to these three aspects of sustainability processes.

The literature shows that historic garden management studies are strongly focused on social sustainability. However, much of this research only regards the social sustainability of material heritage and not the social sustainability of political systems, intangible culture, or wellbeing. Rostami et al. (2015) provide a good review of the literature regarding all aspects of social sustainability; Phillips (2014), Abdel-Rahman and Nourhan (Abdel-Rahman, 2016), and Mahdizadeh and Rajendran (2019) specifically investigate the sustainability of the political institutions governing historic garden conservation; Gao and Dietze-Schirdewahn (2018) address the sustainability of intangible culture in historic gardens. Future research should follow the lead of these authors and look beyond the conservation of material heritage when addressing social sustainability.

Wellbeing is an especially important topic at the moment. A host of literature exists demonstrating the contribution made to wellbeing by urban green spaces and cultural heritage. Research on urban parks and gardens has shown how they contribute to health by providing outdoor areas for play and sport, increasing the amount people walk, reducing stress, and promoting relaxation (Tempesta, 2016). They also contribute to a healthier and more pleasant urban environment by reducing the heat island effect, noise pollution, and atmospheric pollution (Neonato et al., 2018). Cultural heritage in cities is also increasingly recognized as a necessary component of urban life, contributing to creating a sense of place, pride and attachment and belonging, community stability, social infrastructure and capital, and security (Rostami et al., 2015). While historic gardens surely contribute both sets of benefits, research is missing regarding their special contribution to wellbeing. Historic garden researchers should not be content to only cite studies from other subjects quantifying the psychophysical health benefits of nature and culture; they must pursue these areas themselves.

The economic sustainability of historic gardens is also woefully underrepresented in the literature. While Silva and Carvalho (2019) and De Oliveira Paiva, De Brito Sousa and Carcaud (2020) give information and estimates on the income generated by garden tourism, only Askwith (2009) and Pérez-Urrestarazu et al. (2018) even mention the costs of historic gardens. While the former studies provide important information on the general historic garden market, the costs of individual tourist gardens must be known in order to understand how much income gardens need to generate in order to break even. This must then be considered along with marketing segmentation issues (Brandt & Rohde, 2007) and visitor carrying capacity (Benfield, 2001) in order to strategize for an optimum number of visitors who will financially support gardens without irreparably damaging them. In his monograph on garden tourism, Richard Benfield discusses these considerations and also notes that historic and botanical gardens are being increasingly asked to be economically self-sufficient through visitor-induced revenue (Benfield, 2013). However, as both Benfield and Tempesta note, historic gardens are public and merit goods and therefore will always be undervalued by consumers (Tempesta, 2014, 2016, 2018b). According to these authors, they cannot survive without government or philanthropic sponsorship. One reason why UK historic gardens are so lauded in the literature is the relative success achieved by such economic incentive programs as the National Lottery Fund and the intervention of private nonprofit entities such as the National Trust. While UK focused research exists documenting these successes (e.g., Harney, 2014b), examples from other regions and nations would be illuminating. The economic effects of public command, control and incentive measures, as well as private nonprofit intervention, should be a topic for future study. As Tempesta emphasizes, it is essential that the effectiveness and efficiency of these public or philanthropic interventions be evaluated through cost–benefit analysis (Tempesta, 2014) in order to assure that public spending is truly increasing welfare.

While the literature review shows that researchers are quite interested in historic gardens' contribution to environmental sustainability, until now these investigations have mainly

concentrated on gardens' role in maintaining biodiversity by providing habitat for both important native species as well as botanical cultural relicts. This connection between cultural and biological diversity and richness is certainly important, especially considering the habitat loss caused by urbanization. However, in light of the growing concern over urban resilience, growing populations and climate change, these subjects should also be specifically addressed by future historic garden studies.

Ecosystem services are an emerging research subject that seeks to combine all three sustainability pillars in an ecologically and economically founded conceptual framework. They were originally defined by the Millennium Ecosystem Assessment as "the benefits people obtain from ecosystems. These include provisioning services such as food, water, timber, and fiber; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling," (MA, 2005). While the specific nomenclature of these services is still being revised, the concept of assigning a market value to ecological functions to better inform policy and decision-making remains the same. In general, ecosystem services are assigned a total economic value (TEV), comprised of a use-value and a non-use value. Neonato, Tomaselli and Collanino's review provides an initial example of applying Ecosystem Services to historic gardens and other urban green areas (Neonato et al., 2018).

4.4.4 New Regions and Cultures

Although historic garden management literature was concentrated in Europe in the past, where interest in environmental and cultural heritage was a reaction to the losses suffered during the World Wars (Goetcheus & Mitchell, 2014), research is now also coming from Asia, North Africa and South America. This trend may be in response to a greater interest in wellbeing and leisure, a desire to assert a non-colonial national identity or a perceived risk of losing heritage. In any case, these non-Eurocentric studies have much to contribute. They are not only informative because they shed light on previously unexplored landscapes but also because they seem less inhibited in criticizing their national heritage policy and planning measures. European researchers should be inspired by these studies to critically evaluate the effectiveness and efficiency of their national policy and planning system and take a public-choice view of political actors.

In this review, we have also seen that significant inter-European differences remain to be explored regarding historic gardens and their management. For example, Silva and Carvalho (2019) show the differences between the historic garden visitor in Portugal compared to the historic garden visitor in the United Kingdom. Nationwide tourism market studies should be conducted by researchers in order to provide more appropriate and accurate benchmarks for individual gardens. These should be conducted in line with standardized statistical methodologies and sampling scales so that useful comparisons can be made. This review focuses on mainstream scientific publications by selecting literature from the prominent interdisciplinary scientific databases Scopus and WoS. While this choice allows for a panoramic perspective of an already complicated subject, it also may have excluded more locally relevant literature. Future country-specific studies should be more inclusive and look into smaller publications in different languages as well as gray literature.

4.4.5 New Methods and Disciplines

One of the principal goals of this literature review is to identify the research methods and instruments that can best contribute to historic garden management study and indicate where underused methodologies would be particularly valuable. One of the most important such methodologies are those of Resource Economics and Appraisal. In the only reviewed study regarding economic methods, Askwith laments that "those concerned with the conservation of historic parks and gardens have been chary of quantifying their value, fearing perhaps that such an approach, taken in extremis might lead to knowing the price of everything and the value of nothing" (Askwith, 2009). This still seems to be the case. Economic appraisal methods are useful for more than just finances. They investigate community value, the allocation of scarce resources and optimization of wellbeing. Furthermore, they translate these complex considerations into pragmatic, solution-oriented terms.

Cost–benefit analysis studies are particularly useful for showing the lack of public resources invested in heritage and their often-inefficient allocation, with contingent valuation studies continuing to be a preferred method for evaluating the total economic value of both natural and cultural heritage. There are various stated and revealed preference methods that evaluate value in both monetary and non-monetary terms. Historic gardens should be ideal candidates for these methodologies, especially because authors have noted that public administrations tend to undervalue and under-support them. Quantifying their value to the community is a first step in resolving this problem, especially for public gardens. A comparison of costs and benefits should also be part of any feasibility study for tourist gardens within the strategic phase of management. The investigation of performance indicators, such as those used by Pérez-Urrestarazu (2018) would also contribute to a better understanding of historic garden management efficiency, even when making choices such as those suggested by Thoday (2014) to maintain traditional husbandry practices. As a recent doctoral thesis (Seiler, 2020) has shown, traditional gardening methods may sometimes be more efficient than imagined and also contribute added esthetic, ecological, and cultural value.

While methods from Tourism Studies are better represented in the literature review, some gaps in the literature include visitor surveys conducted in different geographic areas and in different kinds of gardens; stocktaking on the number of sites, their ownership, their visitor flows, and their financial balance; studies on carrying capacity assessment; content analysis comparing visitor reviews or garden interpretation material to garden mission statements. New technology using mobile phones and tracking data may make tracking visitor flow and mobility much easier.

As for environmental research methods, biodiversity concerned field studies continue to be important tools for evaluating historic gardens' ecological value as urban habitat. These can be used to calculate and analyze various ecological indicators such as species number, diversity, richness, or number of IUCN Red List species. As mentioned above, the growing field of ecosystem service evaluation offers an interesting way to combine ecological and economic analysis. In addition to biodiversity and habitat, future studies should further investigate the impact historic gardens have on the urban environment, including climate, water-flow, air and soil quality, nutrient cycles (especially carbon), and noise. Other factors such as human health and wellbeing and resilience to climate change should also be further investigated. Research is also needed that investigates the different environmental impacts of different types of historic gardens in a wider array of geographic, climatic and sociocultural contexts. Researchers should not be content to cite the same studies as a benchmark for everything (for example American forestry data are often used to estimate ecosystem services throughout the world, e.g., Neonato et al., 2018), but must achieve more detailed and specific measurements.

Regarding the methodologies from cultural studies and architecture, historical analysis and case studies are well represented in our review. These published studies are invaluable for the owners and managers of historic gardens, who often lack the resources and expertise to dedicate to archival study and detailed site analysis. However, as noted by Brine and Feather (2010), this information often does not reach those who need it most. Authors of the reviewed literature concerned with GIS and computer modeling attempt to resolve this problem by creating applications that can manage information both for managers as well as for the public. However, any such research should also address garden managers' lack of technological skills and need to be in the field. The contribution of smartphones and apps that use their incorporated geographic positioning system (GPS) should be investigated in this regard.

Historic gardens are located at a nexus between nature and culture, making them a particularly fascinating and rewarding laboratory for the disciplines of Museology, Heritage Interpretation, and Environmental Education. Interpretation should also be studied from an economic standpoint, as it adds significant value to the visitor experience if done well, allowing visitors to perceive a wider array of tangible and intangible benefits. Future research may include economic estimates of that perceived benefit, along with a better understanding of how to assess the quality and effectiveness of heritage interpretation in a historic garden.

Finally, it should be noted that most historic garden research has addressed tourist gardens and not public or private gardens. Efforts should be made to address all three typologies and to distinguish each one's particular characteristics and needs.

4.5 Conclusions

This is undeniably a particular moment to be taking stock. Today, in the midst of a global pandemic with dire consequences for human wellbeing and the economic sustainability of heritage conservation, regard for historic gardens seems particularly vital. The tourism revenue that normally economically supports these gardens has been curtailed, while the labor supply that maintains them is being constantly interrupted. Indeed, historic gardens share many of the threats and weaknesses identified by the UN World Tourism Organization (UNWTO) for the Tourism sector in this crisis (UNTWO, 2020), but also present important strengths and opportunities. These outdoor spaces provide rare occasions for contact with nature and fellow man while social distancing is necessary. In light of their heightened vulnerability and importance at this moment, research should draw attention to their many benefits and investigate management strategies and tools that will aid their survival.

While it is still too soon to evaluate the consequences of the COVID-19 pandemic, it will surely be a watershed moment for mankind. The lasting effects of this global natural experiment will not be all bad if researchers can find opportunities to understand how historic gardens can better contribute to wellbeing. At a time when public funding is being spent at unprecedented levels to confront the world's health and economic crisis, decision-makers should be convinced that investments in historic gardens are money well spent and that these spaces are valuable resources for recovering from this crisis, as well as for preventing future calamities. Their many ecosystem services contributing to a resilient and thriving urban environment should be protected and promoted. They also should be some of the first urban tourism attractions ready to safely accommodate visitors increasingly interested in wellness and nature, and thus important contributors to the economic recovery of historic city centers. Quarantine and isolation measures have especially impacted social connections and education, highlighting the social value of historic gardens. Their associations with historic events and people foster a sense of community identity and cohesiveness. They promote both physical and mental health through simple pleasures such as pleasant walks and scenic beauty. They are rich with

educational value, microcosms from which the whole world can be examined and explained to students and enthusiasts alike. Recent studies show how these benefits have been increasingly valued during the pandemic and duly missed when quarantine measures have made them inaccessible (Ugolini et al., 2020). However, all of these social, cultural, environmental and economic benefits must be known if they are to be guaranteed, and they must be studied and communicated according to empiric scientific methods that are precise, unbiased and easily understood by decision-makers.

In order to do so, historic garden researchers must leave behind the expert-driven approaches of the past and find new ways to give a voice to the community and the internal stakeholders that support historic gardens. That is not to say that experts do not have a role. They should use their knowledge to help community members better understand and appreciate historic gardens and advocate for more effective, efficient and equitable policy measures. In this review, Social Science methods from the fields of Resource Economics and Appraisal, Tourism Studies and Urban Heritage Studies are all at the forefront of new explorations in this direction. Future research should continue to build on the general framework and themes analyzed here, focusing on more specific subjects, regions and methods. Indeed, historic gardens offer many opportunities to explore new territory and new methods from paradises that may be overlooked in our very own neighborhoods.

Back Matter

Author Contributions

Conceptualization, C.F.; methodology, C.F.; validation, C.F., V.B. and E.S.; formal analysis, C.F.; investigation, C.F.; data curation, C.F.; writing—original draft preparation, review and editing, C.F., V.B. and E.S.; supervision, E.S. All authors have read and agreed to the published version of the manuscript.

Funding

This research was supported by research funds granted by the Università degli Studi di Palermo's D071-Scienze Agrarie, Alimentari e Forestali Ph.D. program.

Acknowledgments

The authors would like to thank Robert Peel for his reading of the paper and thoughtful suggestions.

Conflicts of Interest

The authors declare no conflict of interest.

Chapter 4 References

Abdel-Rahman, N. H. (2016). Egyptian historical parks, authenticity vs. change in Cairo's cultural landscapes. *Procedia - Social and Behavioral Sciences*, *225*, 391–409. https://doi.org/10.1016/j.sbspro.2016.06.086

Accati, E., & Devecchi, M. (2005). Il restauro del giardino storico. *Italus Hortus*, *12*(4), 17–30.

Albericci, R. (2006). Issues relating to the technical management, the lack of specific skills and the professional training of staff working in botanic gardens and historic parks. *Informatore Botanico Italiano (Atti "Giardino Storico e Orto Botanico: Un bene culturale al servizio della comunità", Erba 11-12/03/2005)*, *38*(1), 298–300.

Alves, M., Vaz, C., Gomes, A., & Virtuoso, F. (2019). Restoration of the masonry arch bridge over Jamor River in the National Palace of Queluz. In R. Aguilar, D. Torrealva, S. Moreira, M. A. Pando, & L. F. Ramos (Eds.), *Structural Analysis of Historical Constructions* (Vol. 18, pp. 2483–2491). Springer International Publishing. https://doi.org/10.1007/978-3-319-99441-3_267

Anderson, L. M., & Cordell, H. K. (1988). Influence of trees on residential property values in Athens, Georgia (U.S.A.): A survey based on actual sales prices. *Landscape and Urban Planning*, *15*(1–2), 153–164. https://doi.org/10.1016/0169-2046(88)90023-0

Arteaga, A., Malumbres-Olarte, J., Gabriel, R., Ros-Prieto, A., Casimiro, P., Sanchez, A., Albergaria, I., & Borges, P. (2020). Arthropod diversity in two historic gardens in the Azores, Portugal. *Biodiversity Data Journal*, *8*, e54749. https://doi.org/10.3897/BDJ.8.e54749

Askwith, C. (2009). The economic contribution of historic parks, gardens and designed landscapes: A review of existing data and research and recommendations for future research. *Cultural Trends, 9:35, 27-79*. https://doi.org/10.1080/09548969909365088

Australia/ICOMOS (1979). Burra Charter 1979. In *Burra-Charter_1979.pdf*. https://australia.icomos.org/wp-content/uploads/Burra-Charter_1979.pdf

Balding, M., & Williams, K. J. H. (2016). Plant blindness and the implications for plant conservation. *Conservation Biology*, *30*(6), 1192–1199. https://doi.org/https://doi.org/10.1111/cobi.12738

Bandarin, F., & Oers, R. van. (2012). *The historic urban landscape: managing heritage in an urban century*. Wiley Blackwell.

Benfield, R. (2001). "Good things come to those who wait": Sustainable tourism and timed entry at Sissinghurst Castle Garden, Kent. *Tourism Geographies*, *3*(2), 207–217. https://doi.org/10.1080/14616680010030275

Benfield, R. (2013). *Garden tourism*. CAB International.

Bergande, B., & Marstein, B. (2013). A preservation and management plan for the Botanic Garden Berlin-Dahlem. *Englera*, *30*, 145–162. http://www.jstor.org/stable/24365190

Birnbaum, Charles. A., & Madigan, K. J. (1996). *The Secretary of the Interior's Standards for the treatment of historic properties: With guidelines for the treatment of cultural landscapes* (C. Capella Peters, Ed.). U.S. Department of Interior, National Park Service, Cultural Resource Stewardship and Partnerships, Heritage Preservation Services, Historic Landscape Initiative (Project).

Boisset, C. M. (1980). The Don Wells memorial essay, 1979: Management of historic gardens—Their role in the present and the future as public amenity areas. *Arboricultural Journal*, *4*(1), 34–40. https://doi.org/10.1080/03071375.1980.10590587

Botanical Gardens Conservation International (BGCI) (2019). *About botanic gardens*. https://www.bgci.org/about/about-botanic-garden/

Brandt, A., & Rohde, M. (2007). Sustainable marketing for historic gardens. *Garden History*, *35*(2), 131–145. https://www.jstor.org/stable/40219923

Brine, A., & Feather, J. (2010). The information needs of UK historic houses: Mapping the ground. *Journal of Documentation*, *66*(1), 28–45. https://doi.org/10.1108/00220411011016353

Burford, G., Hoover, E., Velasco, I., Janoušková, S., Jimenez, A., Piggot, G., Podger, D., & Harder, M. K. (2013). Bringing the "missing pillar" into Sustainable Development Goals: Towards intersubjective values-based indicators. *Sustainability, 5*(7), 3035–3059. https://doi.org/10.3390/SU5073035

Burmil, S. (2000). Issues in the conservation of gardens in Israel: Ramat Hanadiv as a case study. *Studies in the History of Gardens and Designed Landscapes*, *20*(1), 57–68. https://doi.org/10.1080/14601176.2000.10435608

Cappelletti, E. M. (2006). A historical botanic garden, UNESCO World Cultural Heritage: Opportunities and problems. *Informatore Botanico Italiano (Atti "Giardino Storico e Orto Botanico: Un bene culturale al servizio della comunità", Erba 11-12/03/2005)*, *38*(1), 278–284.

Catahan, N., & Woodruffe-Burton, H. (2019). The view, brew and loo: Perceptions of botanic gardens? *Journal of Place Management and Development*, *12*(1), 20–38. https://doi.org/10.1108/JPMD-12-2017-0127

Cavagnero, P., & Revelli, R. (2009). Numerical model application for the restoration of the Racconigi Royal Park (CN, Italy). *Journal of Cultural Heritage*, *10*(4), 514–519. https://doi.org/10.1016/j.culher.2009.01.004

Cazzani, A., Zerbi, C. M., & Brumana, R. (2019). *Management plans and Web-GIS software applications as active and dynamic tools to conserve and valorize historic public gardens*. *42*, 291–298. https://doi.org/10.5194/isprs-archives-XLII-2-W15-291-2019

Cheng, X., van Damme, S., Li, L., & Uyttenhove, P. (2019). Evaluation of cultural ecosystem services: A review of methods. *Ecosystem Services*, *37*. https://doi.org/10.1016/j.ecoser.2019.100925

Ciaffi, M., Alicandri, E., Vettraino, A. M., Paolacci, A. R., Tamantini, M., Tomao, A., Agrimi, M., & Kuzminsky, E. (2018). Conservation of veteran trees within historical gardens (COVE): A case study applied to *Platanus orientalis* L. in central Italy. *Urban Forestry & Urban Greening*, *34*, 336–347. https://doi.org/10.1016/J.UFUG.2018.07.022

Claval, P. (1989). L'étude géographique des parcs et des jardins (A geographical approach of parks and gardens). *Bulletin de l'Association de Géographes Français*, *66*(3), 167–175. https://doi.org/10.3406/bagf.1989.1477

Cole, G. A. (2004). *Management theory and practice*. Cengage Learning EMEA.

Connell, J. (2004). The purest of human pleasures: The characteristics and motivations of garden visitors in Great Britain. *Tourism Management*, *25*(2), 229–247. https://doi.org/10.1016/j.tourman.2003.09.021

Connell, J. (2005). Managing gardens for visitors in Great Britain: a story of continuity and change. *Tourism Management*, *26*(2), 185–201. https://doi.org/10.1016/j.tourman.2003.10.002

Counsell, J. (2001). An evolutionary approach to digital recording and information about heritage sites. *Proceedings of the 2001 Conference on virtual reality, archeology, and cultural heritage - VAST '01*, 33. https://doi.org/10.1145/584993.584999

Dempsey, N., Bramley, G., Power, S., & Brown, C. (2011). The social dimension of sustainable development: Defining urban social sustainability. *Sustainable Development*, *19*(5), 289–300. https://doi.org/10.1002/sd.417

Doolittle, W. E. (2004). Gardens are us, we are nature: Transcending antiquity and modernity. *Geographical Review*, *94*(3), 391–404. https://doi.org/10.1111/j.1931-0846.2004.tb00179.x

European Landscape Convention (2000). European Treaty Series, no. 176. https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=0900001680080621

Fallahi, E. (2017). Horticulture in Iran can be an alternative to petroleum and a major source of international business with unique potential and challenges. *HortScience*, *52*(9), 1145–1147. https://doi.org/10.21273/HORTSCI12080-17

Fallahi, E., Fallahi, P., & Mahdavi, S. (2020). Ancient urban gardens of Persia: Concept, history, and influence on other world gardens. *HortTechnology*, *30*(1), 6–12. https://doi.org/10.21273/HORTTECH04415-19

Flinck, M. (2016). Historic gardens in the center of Stockholm. In G. Groening, G. M. Moore, J. P. Rayner, & E. E. F. Moore (Eds.), *XXIX International Horticultural Congress on horticulture: Sustaining lives, livelihoods and landscapes (IHC2014): V International Conference on landscape and urban horticulture and International Symposium on sustainable management in the urban forest* (Vol. 1108, pp. 115–121). Int Soc Horticultural Science. https://doi.org/10.17660/ActaHortic.2016.1108.14

Gao, L., & Dietze-Schirdewahn, A. (2018). Garden culture as heritage: A pilot study of garden culture conservation based on Norwegian examples. *Urban Forestry and Urban Greening*, *30*, 239–246. https://doi.org/10.1016/j.ufug.2017.03.010

Garcia, C. S. G., Paiva, P. D. O., Alves, S. F. N. S. C., & Salgado, M. C. R. (2017). Transformations in the gardens and landscapes of the historical Traituba's Farm. *Ornamental Horticulture*, *23*(1), 45–57. https://doi.org/10.14295/oh.v23i1.953

Garrod, G., Pickering, A., & Willis, K. (1993). The economic value of botanic gardens: a recreational perspective. *Geoforum*, *24*(2), 215–224. https://doi.org/10.1016/0016-7185(93)90035-G

Goetcheus, C., & Mitchell, N. (2014). The Venice charter and cultural landscapes: Evolution of heritage concepts and conservation over time. *Change Over Time*, *4*(2), 338–357. https://doi.org/10.1353/cot.2014.0018

Gratani, L. (2006). Didactic functionality - The Botanical Garden of Rome. *Italian Botanist*, *38*(1), 254–257.

Gullino, P., Devecchi, M., & Larcher, F. (2020). New sustainable approach for historical garden restoration: the case study of Ludwig Winter's Gardens in Liguria Region. *Acta Horticulturae*, *1279*, 9–14. https://doi.org/10.17660/ActaHortic.2020.1279.2

Gullino, P., Larcher, F., & Devecchi, M. (2010). The importance of the chestnut cultivation and its evolution in the Piedmont landscape (North-West Italy). *Acta Horticulturae*, *866*, 37–42. https://doi.org/10.17660/ActaHortic.2010.866.1

Halbrooks, M. C. (2005). The English Garden at Stan Hywet Hall and Gardens: Interpretation, analysis, and documentation of a historic garden restoration. *HortTechnology*, *15*(2), 196–213. https://doi.org/10.21273/HORTTECH.15.2.0196

Hansen, O. K., Thomsen, P., & Rasmussen, C. W. (2014). DNA markers provide insight about common lime in historical plantings - An example from the Royal Danish Gardens. *Urban Forestry and Urban Greening*, *13*(3), 543–552. https://doi.org/10.1016/j.ufug.2014.04.001

Harney, M. (2014a). *Gardens & landscapes in historic building conservation*. John Wiley & Sons, Ltd.

Harney, M. (2014b). Introduction. In M. Harney (Ed.), *Gardens & landscapes in historic building conservation* (pp. xvx–xiii). John Wiley & Sons, Ltd.

Heywood, V. H. (2017). The future of plant conservation and the role of botanic gardens. *Plant Diversity*, *39*(6), 309–313. https://doi.org/10.1016/j.pld.2017.12.002

ICCROM (2015). People-centred approaches to the conservation of cultural heritage: Living heritage. https://www.iccrom.org/sites/default/files/PCA_Annexe-2.pdf

ICOMOS (1964). *International charter for the conservation and restoration of monuments and sites (the Venice Charter 1964)*. https://www.icomos.org/charters/venice_e.pdf

ICOMOS (1994). *The Nara document on authenticity*. https://www.icomos.org/charters/nara-e.pdf

ICOMOS (2014). *The Florence declaration on heritage and landscape as human values*. http://www.icomos.org.tr/Dosyalar/ICOMOSTR_en0034953001536912096.pdf

ICOMOS General Assembly (2011). *The Valletta Principles for the safeguarding and management of historic cities, towns and urban areas*. https://www.icomos.org/Paris2011/GA2011_CIVVIH_text_EN_FR_final_20120110.pdf

ICOMOS-IFLA (1982). Historic Gardens (The Florence Charter). https://www.icomos.org/images/DOCUMENTS/Charters/gardens_e.pdf

ICOMOS-IFLA (2017). Document on Historic Urban Parks. https://www.icomos.org/images/DOCUMENTS/General_Assemblies/19th_Delhi_2017/Working_Documents-First_Batch-August_2017/GA2017_6-3-2_HistoricUrbanPublicParks_EN_final20170730.pdf

Ionescu, R., Iliescu, A. F., & Dumitrascu, M. (2010). Historical garden as cultural identity mark in Bucharest urban landscape - Case study: The Kiseleff road and garden. *Acta Horticulturae*, *881*, 851–854. https://doi.org/10.17660/ACTAHORTIC.2010.881.141

ISPRS (2013). *ISPRS_brochure.pdf*. https://www.isprs.org/publications/brochure/ISPRS_brochure.pdf

James, P., & Magee, L. (2016). Domains of Sustainability. In A. Farazmand (Ed.), *Global Encyclopedia of Public Administration, Public Policy, and Governance* (pp. 1–17). Springer International Publishing. https://doi.org/10.1007/978-3-319-31816-5_2760-1

Journal of Cultural Heritage (n.d.). https://www.journals.elsevier.com/journal-of-cultural-heritage

Kempiak, J., Hollywood, L., Bolan, P., & McMahon-Beattie, U. (2017). The heritage tourist: An understanding of the visitor experience at heritage attractions. *International Journal of Heritage Studies*, *23*(4), 375–392. https://doi.org/10.1080/13527258.2016.1277776

Khalilnezhad, S. M. R. (2017). Principles of integration of the agriculture and pleasure greeneries in Persian gardens. *Acta Horticulturae*, *1189*, 39–42. https://doi.org/10.17660/ActaHortic.2017.1189.7

Kowarik, I., & Wohlgemuth, J. O. (2006). *Tulipa sylvestris* (*Liliaceae*) in Northwestern Germany: A non-indigenous species as an indicator of previous horticulture. *Polish Botanical Studies*, *22*, 317–331. http://www.ib-pan.krakow.pl/.../pbs.htm

Krishnan, S., & Novy, A. (2016). The role of botanic gardens in the twenty-first century. *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*, *11*. https://doi.org/10.1079/PAVSNNR201611023

Krosigk, K. Von (1987). Preservation and maintenance of historic gardens and parks in West Germany. *Landscape Research*, *12*(2), 18–21. https://doi.org/10.1080/01426398708706227

Kümmerling, M., & Müller, N. (2012). The relationship between landscape design style and the conservation value of parks: A case study of a historical park in Weimar, Germany. *Landscape and Urban Planning*, *107*(2), 111–117. https://doi.org/10.1016/J.LANDURBPLAN.2012.05.006

Landscape and Urban Planning (n.d.). https://www.journals.elsevier.com/landscape-and-urban-planning

Leiper, N. (1990). Tourist attraction systems. *Annals of Tourism Research*, *17*(3), 367–384. https://doi.org/10.1016/0160-7383(90)90004-B

Liston-Heyes, C., & Heyes, A. (1999). Recreational benefits from the Dartmoor National Park. *Journal of Environmental Management*, *55*(2), 69–80. https://doi.org/10.1006/jema.1998.0244

Luz, I. C. A., Paiva, P. D. De O., & Alves, S. F. N. da S. C. (2018). Train station area gardens: The creation and evolution of Dr. José Esteves Square, in Lavras-MG. *Ornamental Horticulture*, *23*(4), 432–443. https://doi.org/10.14295/oh.v23i4.1117

MA (2005). *Ecosystems and human well-being: synthesis* (Millennium Ecosystem Assessment, Ed.). Island Press.

Mahdizadeh, S., & Rajendran, L. P. (2019). A renewed approach to conservation policy of historical gardens in Iran. *Landscape Research*, *44*(1), 48–61. https://doi.org/10.1080/01426397.2017.1413176

Mahmood, P., & Nasim, S. (2012). *The manner of rehabilitation of historical vernacular gardens (case study is Ali Abad Garden in Bojnourd-Iran)* (J. Jasienko, Ed.). Dolnoslaskie Wydawnictwo Edukacyjne-Dwe.

Malinverni, E. S., Chiappini, S., & Pierdicca, R. (2019). A geodatabase for multisource data management applied to cultural heritage: The case study of Villa Buonaccorsi's historical garden. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, *XLII-2/W11*, 771–776. https://doi.org/10.5194/isprs-archives-XLII-2-W11-771-2019

Mang, B. (2013). The Austrian Federal Gardens and their plant collections – Historical garden monuments, cultural heritage, recreational spaces and tourist attractions. *Englera*, *30*, 137–144. http://www.jstor.org/stable/24365189

Markwell, S., Bennett, M., & Ravenscroft, N. (1997). The changing market for heritage tourism: A case study of visits to historic houses in England. *International Journal of Heritage Studies*, *3*(2), 95–108. https://doi.org/10.1080/13527259708722193

Maurer, U., Peschel, T., & Schmitz, S. (2000). The flora of selected urban land-use types in Berlin and Potsdam with regard to nature conservation in cities. *Landscape and Urban Planning*, *46*(4), 209–215. https://doi.org/10.1016/S0169-2046(99)00066-3

Mazza, I. (2002). Organization and decision-making in the heritage sector in Sicily. In I. Rizzo & R. Towse (Eds.), *The economics of heritage: A study in the political economy of culture in Sicily* (pp. 48–62). Edward Elgar Pub.

Meda, P., & Rinaldi, G. (2006). Gestione e apertura a un pubblico non universitario degli Orti botanici universitari, sintesi di un questionario di autovalutazione. *Informatore Botanico Italiano (Atti "Giardino Storico e Orto Botanico: Un bene culturale al servizio della comunità", Erba 11-12/03/2005)*, *38*(1), 312–314.

Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLOS Medicine*, *6*(7), e1000097. https://doi.org/10.1371/JOURNAL.PMED.1000097

Nascimbene, J., & Salvadori, O. (2008). Lichen recolonization on restored calcareous statues of three Venetian villas. *International Biodeterioration & Biodegradation*, *62*(3), 313–318. https://doi.org/10.1016/j.ibiod.2007.11.005

Natural England (2008). *Preparing a heritage management plan*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/350304/NE63-preparing-a-heritage-management-plan.pdf

Neonato, F., Colaninno, B., & Tomasinelli, F. (2018). Green ecosystem services: TEV as tool to take decision for urban Planning. *Economics and Policy of Energy and the Environment*, *2018*(2), 85–112. https://doi.org/10.3280/EFE2018-002005

Obad Šćitaroci, M., Marić, M., Vahtar-Jurković, K., & Knežević, K. R. (2019). *Revitalisation of historic gardens—Sustainable models of renewal*. Springer. https://doi.org/10.1007/978-3-030-10612-6_27

Oishi, Y. (2019). Urban heat island effects on moss gardens in Kyoto, Japan. *Landscape and Ecological Engineering*, *15*(2), 177–184. https://doi.org/10.1007/s11355-018-0356-z

Our Journal - Landscape Research Group (n.d.). *https://landscaperesearch.org/*. https://landscaperesearch.org/our-journal/

Paiva, P. D. De O., Sousa, R. De B., & Carcaud, N. (2020). Flowers and gardens on the context and tourism potential. *Ornamental Horticulture*, *26*(1), 121–133. https://doi.org/10.1590/2447-536x.v26i1.2144

Pérez-Urrestarazu, L., Egea, G., Ruiz-Alcalá, C., Roldán-Olmo, F., & Fernández-Cañero, R. (2018). Water management assessment in a historic garden: The case study of the Real Alcazar (Seville, Spain). *Urban Forestry & Urban Greening*, *29*, 192–199. https://doi.org/10.1016/j.ufug.2017.11.020

Phillips, A. (2014). The international context - the European Landscape Convention. In *Gardens & landscapes in historic building conservation* (pp. 309–320). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.ch31

Poria, Y., Butler, R., & Airey, D. (2004). Links between tourists, heritage, and reasons for visiting heritage sites. *Journal of Travel Research*, *43*(1), 19–28. https://doi.org/10.1177/0047287504265508

Powe, N. A., & Willis, K. G. (1996). Benefits received by visitors to heritage sites: A case study of Warkworth Castle. *Leisure Studies*, *15*(4), 259–275. https://doi.org/10.1080/026143696375558

Powe, N. A., Garrod, G. D., & Willis, K. G. (1995). Valuation of urban amenities using an hedonic price model. *Journal of Property Research*, *12*(2), 137–147. https://doi.org/10.1080/09599919508724137

Powledge, F. (2011). The evolving role of botanical gardens: Hedges against extinction, showcases for botany? *BioScience*, *61*(10), 743–749. https://doi.org/10.1525/bio.2011.61.10.3

Prigioniero, A., Sciarrillo, R., Spuria, L., Zuzolo, D., Marziano, M., Scarano, P., Tartaglia, M., & Guarino, C. (2021). Role of historic gardens in biodiversity-conservation strategy: the example of the Giardino Inglese of Reggia di Caserta (UNESCO) (Italy). *Plant Biosystems - An International Journal Dealing with All Aspects of Plant Biology*, *155*(5), 983–993. https://doi.org/10.1080/11263504.2020.1810812

Rizzo, I., & Towse, R. (Eds.). (2002). *The Economics of Heritage*. Edward Elgar Publishing. https://EconPapers.repec.org/RePEc:elg:eebook:2770

Rostami, R., Lamit, H., Khoshnava, S., Rostami, R., & Rosley, M. (2015). Sustainable cities and the contribution of historical urban green spaces: A case study of historical Persian gardens. *Sustainability*, *7*(10), 13290–13316. https://doi.org/10.3390/su71013290

Saeed, M., Qasim, M., Khan, M. M., & Ali, T. (2017). Historic gardens can attract more visitors by the provision of more facilities: A case study of Three Mughal gardens of Pakistan. *Pakistan Journal of Agricultural Sciences*, *54*(01), 45–50. https://doi.org/10.21162/PAKJAS/17.5478

Sales, J. (2000). Conserving historic gardens. *Journal of Architectural Conservation*, *6*(2), 72–84. https://doi.org/10.1080/13556207.2000.10785271

Sanders, D. L., Ryken, A. E., & Stewart, K. (2018). Navigating nature, culture and education in contemporary botanic gardens. *Environmental Education Research*, *24*(8), 1077–1084. https://doi.org/10.1080/13504622.2018.1477122

Seiler, J. (2020). *Management regimes for lawns and hedges in historic gardens*. https://gupea.ub.gu.se/handle/2077/62813

Silva, S., & Carvalho, P. (2019). Visiting gardens in Portugal: Profiling the historic gardens visit and visitors. *Tourism Innovation: Technology, Sustainability and Creativity*, 127–147. https://www.taylorfrancis.com/chapters/edit/10.4324/9780429022814-9/visiting-gardens-portugal-susana-silva-paulo-carvalho

Tempesta, T. (2014). People's preferences and landscape evaluation in Italy: a review. *New Medit*, *1*, 10.

Tempesta, T. (2016). Benefits and costs of urban parks: a review. *Aestimum*, 67, 127–143 Pages. https://doi.org/10.13128/AESTIMUM-17943

Tempesta, T. (2018b). Degradation of the Palladian landscape. *Aestimum*, 72, 109–130 Pages. https://doi.org/10.13128/AESTIMUM-23971

Thoday, P. (2014). Science and craft in understanding historic gardens and their management. In M. Harney (Ed.), *Gardens & landscapes in historic building conservation* (pp. 141–148). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.ch13

Thorne, N. (2014). Costing and contracts for historic gardens and landscapes. In M. Harney (Ed.), *Gardens & landscapes in historic building conservation* (pp. 239–246). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.ch23

Tisi, F. (2006). Making the most of educational experiences in historic and botanical gardens in Trentino. *Informatore Botanico Italiano (Atti "Giardino Storico e Orto Botanico: Un Bene culturale al servizio della comunità", Erba 11-12/03/2005)*, *38*(1), 258–264.

Todt, H., Herder, J. G., & Dabija, D.-C. (2008). The role of monument protection for tourism. *Amfiteatru Economic*, *10*, 292–297.

Towse, R. (2019). *A textbook of cultural economics*. (2nd ed.). Cambridge University Press.

Ugolini, F., Massetti, L., Calaza-Martínez, P., Cariñanos, P., Dobbs, C., Ostoic, S. K., Marin, A. M., Pearlmutter, D., Saaroni, H., Šaulienė, I., Simoneti, M., Verlič, A., Vuletić, D., & Sanesi, G. (2020). Effects of the COVID-19 pandemic on the use and perceptions of urban green space: An international exploratory study. *Urban Forestry & Urban Greening*, *56*, 126888. https://doi.org/10.1016/J.UFUG.2020.126888

UNESCO (2005). Vienna Memorandum on "World heritage and contemporary architecture - Managing the historic urban landscape" and Decision 29 COM 5D. https://whc.unesco.org/archive/2005/whc05-15ga-inf7e.pdf

UNESCO (2011). *Recommendation on the historic urban landscape*. https://whc.unesco.org/uploads/activities/documents/activity-638-98.pdf

UNESCO (2021, July 31). *UNESCO World Heritage Centre - the Operational Guidelines for the implementation of the World Heritage Convention* (WHC.21/01). https://whc.unesco.org/en/guidelines/

United Nations (2015). *United Nations Sustainable Development Goals - 11 Sustainable cities and communities - Goal 11 Targets*. https://www.un.org/sustainabledevelopment/cities/

UNTWO (2020). *World Tourism Barometer May 2020 Special focus on the Impact of COVID-19*. https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2020-05/Barometer_May2020_full.pdf

Urban Forestry & Urban Greening (n.d.). https://www.journals.elsevier.com/urban-forestry-and-urban-greening

US/ICOMOS (2004). *Natchitoches Declaration on heritage landscapes*. US/ICOMOS. https://usicomos.org/wp-content/uploads/2019/12/213natchitoches.pdf

Vissac, C. (2005). Study of a historical garden soil at the Grand-Pressigny site (Indre-et-Loire, France): Evidence of landscape management. *Journal of Cultural Heritage*, *6*(1), 61–67. https://doi.org/10.1016/J.CULHER.2004.07.002

Wahurwagh, A., & Dongre, A. (2015). Burhanpur cultural landscape conservation: Inspiring quality for sustainable regeneration. *Sustainability*, *7*(1), 932–946. https://doi.org/10.3390/su7010932

Willis, K. G. (1994). Paying for heritage: what price for Durham cathedral? *Journal of Environmental Planning and Management*, *37*(3), 267–278. https://doi.org/10.1080/09640569408711975

Zopiatis, A., & Melanthiou, Y. (2019). The celebrity chef phenomenon: a (reflective) commentary. *International Journal of Contemporary Hospitality Management*, *31*(2), 538–556. https://doi.org/10.1108/IJCHM-12-2017-0822

Zuelow, E. G. E. (2016). *A history of modern tourism*. Macmillan Education UK. https://doi.org/10.1007/978-0-230-36966-5

Chapter 5 – The Political Governance of Historic Gardens

5.1 Overview

Although interest in Historic Garden conservation can be traced much farther back, it would be the large-scale destruction of heritage in Europe during the two World Wars followed by the institution of the inter-governmental agencies such as UNESCO (United Nations Educational Scientific and Cultural Organization) and ICOMOS (International Council of Monuments and Sites) that would bring about the first internationally agreed upon historic garden policies that define key terminology, and guidelines (Goetcheus & Mitchell, 2014) . Of course, this was part of a wider movement to conserve all cultural and natural heritage. Over time, the connection between natural and cultural patrimony would be increasingly seen as fundamentally intertwined. Historic gardens, and later cultural landscapes, occupy a special place in the development of all heritage conservation policies, because they make that connection between nature and culture particularly evident. Despite their special role, or perhaps exactly because their transversality makes them hard to categorize, historic gardens seem to have become lost in the evolving panorama of international cultural and environmental policy.

Indeed, very few policy documents specifically address historic gardens and even fewer are known and referenced in research and in practice (Funsten et al., 2020). Furthermore, the literature has also shown that scholars are quite critical of how international historic garden policy is practically applied by national, regional and local governments. Some governments do not consider historic gardens as worthy of special attention (Abdel-Rahman, 2016; Mahdizadeh & Rajendran, 2019), and those that do have followed the vision of older conservation policies and focused on their protection from change rather than seeking to direct change in a positive direction (Funsten et al., 2020).

The failure of governing institutions to recognize and apply historic garden policy is related to issues of sustainable development, i.e., “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and & Development, 1987). Classically, sustainable development is conceived as being supported by three (economic, social and environmental) pillars (United Nations Economic and Social Council, 2020). Political sustainability is increasingly recognized in scholarly literature and in public policy as an important aspect of social sustainability or even as a separate “fourth pillar” (Burford et al., 2013; P. James & Magee, 2016; Phillips, 2014; Rostami et al., 2015; United Nations, 2015a). Political institutions play a role in sustainable development in two ways, by establishing norms and by establishing institutional mechanisms (rules and procedures) to promote and enforce those norms (Burford et al., 2013).

Thus, historic gardens are not currently sustainable (serving current needs in a way that maintains them for future generations) in part because they are not properly supported by political institutions. Specifically, the existing policy put in place to establish norms to achieve sustainable outcomes often fail to achieve relevancy. In the field of policy evaluation, relevance can be defined as “the ability of a policy document to respond to the needs and challenges faced by society” (Gradinaru et al., 2023).

A first step in determining whether policy documents are relevant is by examining their content, i.e., asking what norms they seek to establish and what institutional mechanisms they institute to assure this occurs. For example, Gradinaru et al. (2023) use document content analysis to investigate how equity in green space infrastructure has been addressed in the strategic planning documents of the majority (75%) of Romanian cities. Data derived from each city’s plan is compared to that city’s characteristics (size, development region, green space per capita) and social structure (population percentage of children, teenagers and elderly people and

population percentage of people living in marginalized urban areas, i.e., areas with disadvantages in terms of human capital, regular employment and housing) through statistical analysis. They found that while most of the examined plans claimed to address equity issues in urban greening, these were limited in scope to availability and attractiveness. Strategic plans emphasized the needs of children, teenagers and the elderly but not those of other vulnerable groups such as ethnic minorities, people with educational, work and housing disadvantages or immigrants. Furthermore, they found that most strategic plans don't name the specific actors or public entities responsible for the implementation of green space equity measures, and only about half consider funding sources. The monitoring of project outcomes is also neglected by most strategic plans. The authors note that these omissions transform the examined planning documents to "mere statements of intent".

In response to the consensus in the literature that historic garden policy is not functioning efficiently and thus not responding to society's needs and challenges, this chapter focuses on the political governance of historic gardens from a sustainable development point of view, looking first at the norms proposed in policy documents and then critically examining how those norms are (or are not) assured through institutional mechanisms. Specifically, section 5.2 aims to clarify where historic gardens stand in natural and cultural heritage policy by compiling and analyzing an international and European historic garden policy framework; section 5.3 examines the relevance of the most cited policy document in the literature, the Florence Charter, by comparing its recommendations to the international, Italian, regional and municipal policy that effectively governs historic gardens using the city of Palermo (Italy) as a reference; section 5.4 discusses a measure within a recent Italian financial incentive policy meant to promote historic garden conservation and fruition; section 5.5 investigates the real impact of historic garden policy by performing a spatial analysis of the international, national, regional, and municipal catalogues and lists of protected historic gardens in force in the municipality of Palermo (Sicily, Italy), comparing the spatial distribution of sites to both the targeted potential beneficiaries and real recreational demand.

These three desk studies provide a necessary foundation for the economic and social analyses in later chapters and also have theoretical and practical implications regarding historic garden management specifically and heritage management within the increasingly prevalent sustainability framework in general. Indeed, to the author's knowledge no such work has been carried out in Italy, even though it is the country with the most academic publications regarding historic garden management (Funsten et al., 2020). The results of the investigations presented in this chapter will contribute to filling a major gap in historic garden research regarding the political sustainability of historic gardens, and that the information provided will inspire scholars to address these underdeveloped issues. Furthermore, they point out significant flaws limiting the relevancy of existing heritage policy. Both the results and the methods themselves can help policy makers and stakeholders better design policy and the institutional mechanisms regulating its application to better serve present and future populations.

Section 5.1 References

Abdel-Rahman, N. H. (2016). Egyptian historical parks, authenticity vs. change in Cairo's cultural landscapes. *Procedia - Social and Behavioral Sciences*, *225*, 391–409. https://doi.org/10.1016/j.sbspro.2016.06.086

Burford, G., Hoover, E., Velasco, I., Janoušková, S., Jimenez, A., Piggot, G., Podger, D., & Harder, M. K. (2013). Bringing the "missing pillar" into Sustainable Development Goals: Towards intersubjective values-based indicators. *Sustainability, 5*(7), 3035–3059. https://doi.org/10.3390/SU5073035

Funsten, C., Borsellino, V., & Schimmenti, E. (2020). A systematic literature review of historic garden management and its economic aspects. *Sustainability*, *12*(24). https://doi.org/10.3390/su122410679

Goetcheus, C., & Mitchell, N. (2014). The Venice charter and cultural landscapes: Evolution of Heritage concepts and conservation over time. *Change Over Time*, *4*(2), 338–357. https://doi.org/10.1353/cot.2014.0018

Gradinaru, S. R., Onose, D. A., Oliveira, E., Slave, A. R., Popa, A. M., & Gravrilidis, A. A. (2023). Equity in urban greening: Evidence from strategic planning in Romania. *Landscape and Urban Planning*, *230*, 104614. https://doi.org/10.1016/J.LANDURBPLAN.2022.104614

James, P., & Magee, L. (2016). Domains of sustainability. In A. Farazmand (Ed.), *Global encyclopedia of public administration, public policy, and governance* (pp. 1–17). Springer International Publishing. https://doi.org/10.1007/978-3-319-31816-5_2760-1

Mahdizadeh, S., & Rajendran, L. P. (2019). A renewed approach to conservation policy of historical gardens in Iran. *Landscape Research*, *44*(1), 48–61. https://doi.org/10.1080/01426397.2017.1413176

Phillips, A. (2014). The international context - the European Landscape Convention. In *Gardens & landscapes in historic building conservation* (pp. 309–320). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.ch31

Rostami, R., Lamit, H., Khoshnava, S., Rostami, R., & Rosley, M. (2015). Sustainable cities and the contribution of historical urban green spaces: A case study of historical Persian gardens. *Sustainability*, *7*(10), 13290–13316. https://doi.org/10.3390/su71013290

United Nations (2015a). *United Nations Sustainable Development Goals - 11 Sustainable Cities and Communities - Goal 11 Targets*. https://www.un.org/sustainabledevelopment/cities/

World Commission on Environment and, & Development. (1987). Report of the World Commission on Environment and Development: Our common future towards sustainable development. https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf

5.2 International Policy Relevant to Historic Garden Management

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Working paper

5.2.1 Introduction

Scholarly literature tends to limit itself to citing just a few historic garden policy initiatives, namely the Florence Charter jointly ratified in 1982 by ICOMOS and the International Federation of Landscape Architects (IFLA) and UNESCO's World Heritage Convention adopted in 1972 (Funsten et al., 2020). While still quite important, these policies propose a dated vision of conservation that is not representative of today's ideologies and objectives.

There are many more pertinent policies to consider, including guiding documents, as well as binding international treaties and laws. The charters and declarations that are termed guiding documents are "statements of best practices or declarations of intent" (Forster, 2014). They are non-binding and are not committed to by political representatives with plenipotentiary powers. However, this does not mean that they are irrelevant. They are often the inspiration for legislation and become customary law when universally applied. Binding international policy, on the other hand, is a legal document agreed upon by political representatives vested with the power to represent their governments. These documents may be in the form of international agreements, treaties or laws.

Given the narrow view of historic garden literature published before 2020 (Funsten et al., 2020), the main objective of this section is to connect historic gardens to the wider natural and cultural heritage policy influencing their conservation planning and practice. It also serves to document the heritage terminology that is applicable to historic gardens, along with its sources and development. By ignoring much of cultural and natural heritage policy, historic garden scholars and practitioners miss many opportunities, especially wider support from government institutions and the public.

In order to do this, the content of policy documents is examined, beginning with the Athens Charter in 1931 and ending with the Florence Declaration on Heritage and Landscape as Human Values in 2015. This period is chosen because it is the reference period for the above-mentioned body of historic garden literature and comprises two completed periods of historic garden policy (Goodchild, 2009). The first was driven by the 1982 Florence Charter (ICOMOS-IFLA, 1982) and the second was driven by the 2000 European Landscape Convention (2000). 2015 marks the beginning of a third period, driven by the United Nations 2030 Agenda for Sustainable Development (United Nations, 2015b), which has not yet concluded.

5.2.2 Materials and Methods

This section of the dissertation applies a qualitative document content analysis method to international binding and nonbinding policy regarding historic gardens. A snowball sampling method is used to identify pertinent policy. The sampling and coding analysis of documents concluded in September 2020.

For guiding documents, sampling began with policy documents cited in Goetcheus & Mitchell, 2014, which analyses the development of key concepts and terms concerning cultural landscapes in the international guiding documents of the 20th and 21st centuries. For binding documents, this investigation begins with those presented in Harney, (2014a), specifically the international treaties and European laws listed by Denyer (2014), Forster (2014), Harney (2014b), Mynors (2014), and Phillips (2014). As Mynors (2014) notes, historic gardens are only fortuitously protected by legislative codes that were devised without them in mind. Thus, it is important to recognize the opportunities and repercussions of this inadvertent protection.

After a preliminary analysis of these initial seed documents, other documents were added that were found in the seed documents or in the corpus of doctrinal texts of the same emanating political entities. Both seed and subsequently added policy documents were then read and re-

analyzed for key terms and implications regarding historic gardens. Specifically, a coding schedule was compiled for each document including: the year it was emanated; its name; the political entity involved; its key terms regarding what heritage assets it values and what heritage conservation actions it promotes; its implications for historic gardens, specifically how they are addressed and what policy principles are recognized by guiding documents or what policy principles are established by binding documents.

5.2.3 Results

The following results synthesize the chronologic development of international guiding and binding historic garden heritage policy and report the coding results of each respective category.

5.2.3.1 Guiding Documents

The first internationally recognized guidelines for the conservation of heritage, the Athens Charter for the Restoration of Historic Monuments (First International Congress of Architects and Technicians of Historic Monuments, 1931), and the Venice Charter for the Conservation and Restoration of Monuments and Sites (ICOMOS, 1964), were both primarily concerned with specific monuments, although the Venice Charter did include the "the urban or rural setting in which is found the evidence of a particular civilization, a significant development or a historic event" (art. 1) and the historic sites of monuments (art. 14). Furthermore, the Venice Charter would be the foundation for subsequent charters issued by ICOMOS, including the Florence Charter for the preservation of historic gardens (ICOMOS-IFLA, 1982).

Following the UNESCO World Heritage Convention of 1972 (discussed below in the section on binding policy), the Operational Guidelines were released to explain the procedures for the inscription, protection, conservation, and granting of international assistance for World Heritage properties. The first Operational Guidelines were drafted in 1977, with periodic revisions made over the years (UNESCO, 2021). In 1992, a definition of "cultural landscape" was added, leading to a broader understanding of heritage (Goetcheus & Mitchell, 2014). Denyer (2014) asserts that the cultural landscape category "brought the interaction between nature and culture to the forefront of conservation thinking" and let parts of the world without traditional heritage monuments be recognized and celebrated. The Operational Guidelines also explicitly define "outstanding universal value" and the cultural and the natural criteria for determining it.

In 1979, The Australia/ICOMOS Charter for places of cultural significance, also called the Burra Charter, was established. This dynamic document is continually revised, with the most current version released in 2013 (Australia ICOMOS, 2013). In line with the Venice Charter's statement that each country should use "the framework of its own culture and tradition", it was adopted as Australia's working document for heritage conservation and was also intended for international use (Australia/ICOMOS, 1979). It defined key conservation terms and introduced the concepts of 'place' and 'cultural significance' and included intangible aspects of cultural heritage. The importance attributed to cultural significance as the basis of all conservation decisions was particularly ahead of its time, as was the Burra Charter Process for the planning and management of places of cultural significance. The Burra Charter Process would inspire the future management plan processes used by international and national institutions (Goetcheus & Mitchell, 2014) such as UNESCO (UNESCO, 2011), the National Trust (in the

United Kingdom) (Lithgow & Thackray, 2009) and the National Park Service (in the United States of America) (Halbrooks, 2005).

In 1981, the ICOMOS-IFLA International Committee for historic gardens drafted the Florence Charter (ICOMOS-IFLA, 1982) on historic gardens as an addendum to the Venice Charter. For the first time, a policy recognized gardens as "living monuments". In the wider realm of heritage conservation, the Florence Charter led to a great leap forward by introducing a "dynamic process-oriented view of cultural and natural systems instead of static monuments" (Goetcheus & Mitchell, 2014). Although historic garden scholars tend to focus exclusively on this document, historic garden preservation must be seen in the wider discourse of cultural heritage. From the Florence Charter on, gardens have been recognized as an important sub-group of cultural and natural heritage and consequentially are implied or renamed as conceptual frameworks have evolved and are observed at different scales.

In 1994, ICOMOS issued the Nara Document on Authenticity (ICOMOS, 1994). Up until this point, the concept of authenticity had only been applied to the material elements, i.e., the fabric, of a heritage asset. Influenced by the 1972 World Heritage Convention, the Nara document stated the importance of tangible and intangible cultural diversity and redefined authenticity as essential in attributing value to heritage that must come from "within the cultural contexts to which they belong" (ICOMOS, 1994). Authenticity was put forward as the antithesis of globalization and aggressive nationalism, and as vital in clarifying and illuminating "the collective memory of humanity" (ICOMOS, 1994).

In 2004, the U.S. ICOMOS branch issued the Natchitoches Declaration on Heritage Landscapes (US/ICOMOS, 2004), which focused on "the interface of nature and culture in the landscape." It emphasized interdisciplinary, community-based approaches in the planning and management of cultural landscapes that value traditional practices and living traditions. The Declaration also emphasized the link between cultural diversity and biodiversity.

In 2011, ICOMOS issued the Valletta Principles for the Safeguarding and Management of Historic Cities, Towns and Urban Areas (ICOMOS General Assembly, 2011). The same year UNESCO released its Recommendation on the Historic Urban Landscape (UNESCO, 2011), addressing urban expansion with a landscape approach that seeks to identify, preserve and manage historic urban heritage. It defines the Historic Urban Landscape as "the urban area understood as the result of a historic layering of cultural and natural values and attributes, extending beyond the notion of "historic center" or "ensemble" to include the broader urban context and its geographical setting" (art. 8) (UNESCO, 2011). Like the Burra Charter process, the "HUL Toolkit" contained in the document proposes a defined action-pan including civic engagement tools, knowledge and planning tools, regulatory systems and financial tools, to support communities "in their quest for development and adaptation, while retaining the characteristics and values linked to their history and collective memory, and to the environment" (art. 15) (UNESCO, 2011). It emphasizes the involvement of all stakeholders and encourages public-private partnerships.

ICOMOS released the Florence Declaration on Heritage and Landscape as Human Values in 2015 (ICOMOS, 2014). This document continues the trends foreseen by Goetchus and Mitchell (2014), including an increasing focus on intangible assets, community involvement, and sustainability. It recognizes the importance of the landscape as a "cultural habitat" as well as its essential role in sustainable development.

Table 9 reports the coding results of the sampled guiding documents.

Table 9 - International Guiding Documents Regarding Historic Gardens

Year	Name	Entity	Key terms	Historic garden implications
1931	Athens Charter for the Restoration of Historic Monuments	First International Congress of Architects and Technicians of Historic Monuments	Assets: Character; Historical value. Actions: Restoration; Preservation; Maintenance; Conservation.	Addresses: Historic gardens as "historical sites". Recognizes: Public/private conflict and "owners' sacrifice for the general interest"; Importance of the aesthetic quality of surroundings; Role of the ornamental vegetation in preserving character; Role of education in people's attachment.
1964	The Venice Charter for the Conservation and Restoration of Monuments and Sites	ICOMOS	Assets: Human value; Common heritage; Authenticity; Historical evidence; Historic Sites. Actions: Conservation; Maintenance; Restoration.	Addresses: Historic gardens as "historic sites" or "settings". Recognizes: Possible need for a change of function for a monument to maintain a socially useful purpose; That historic sites should receive special care to maintain their integrity and be "cleared and presented in a seemly manner".
1977 (continually revised up to 2019, with relative Bureau reference noted)	Operational guidelines for the implementation of the World Heritage Convention	UNESCO	Assets: Cultural heritage; Natural heritage; Outstanding universal value; Cultural significance; Natural significance; Authenticity (39 COM 11); Integrity (20 COM IX.13). Actions: Assessment; Inscription; Protection; Management; Monitoring;	Addresses: Historic gardens as "mixed cultural and natural heritage" or "cultural landscapes" (annex 3). Recognizes: Importance of the "management plan or system, which must specify how the Outstanding Universal Value of a property should be preserved, preferably through participatory means." Management systems may vary but must include: a clearly defined operational

			Sustainable use (43 COM 11A).	boundary considering buffer zones; short, medium and long-term actions to protect, conserve and present the nominated property; reactive and periodic monitoring and reporting (39 COM 11, 43 COM 11A).
1979, (1981, 1988, 1999, 2013)	The Burra Charter	Australia/ICOMOS	Assets: Place; Cultural significance; Fabric; Use (1999); Associations (1999); Meanings (1999); Significant uses (1999); Related places (1999); Coexistence of cultural values (1999). Actions: Conservation; Preservation; Restoration; Maintenance; Reconstruction; Adaptation; Management (1999).	Addresses: Historic gardens as "places of cultural significance", and as of the 1999 revision, the Charter specifies that a place also applies to trees, gardens, and parks. Recognizes: The Burra Charter process, a 3-step conservation process (understanding cultural significance, development of policy, management); That conservation, interpretation and management of a place should provide for the participation of people for whom the place has special associations and meanings, or who have social, spiritual or other cultural responsibilities for the place (as of 1999); Interpretation as an important tool in making cultural significance understandable, enjoyable and culturally appropriate.
1981	The Florence Charter on Historic Gardens	ICOMOS-IFLA	Assets: Historic Garden; Historic site; Authenticity. Actions: Preservation; Identification; Listing; Maintenance; Conservation; Restoration;	Addresses: Historic gardens explicitly. Recognizes: Plant material as an essential component of the "living monument"; That the continual and planned replacement and renewal of said plants should be done with appropriate species; That access should be restricted according to the

			Reconstruction.	size and vulnerability of the site; That maintenance and conservation should always take precedence over public use; Need to ensure the availability of trained experts and suitable plant varieties.
1994	Nara Document	ICOMOS	Assets: Cultural diversity; Heritage diversity; Authenticity Actions: Protection and enhancement of cultural and heritage diversity; Acknowledgement of the legitimacy of all conflicting parties' cultural values; Respect for the heritage of all cultures and societies; Judgement and consideration of heritage properties within the cultural contexts to which they belong.	Addresses: Historic gardens as "cultural properties" and "tangible expressions of heritage". Recognizes: Need for greater respect for diversity in conservation practice; That cultural identities are sometimes affirmed with aggressive nationalism to suppress the cultures of minorities; That cultural and heritage diversity is a source of spiritual and intellectual wealth; Responsibility for heritage and its management belongs principally to the community that generated it, and subsequently to those who care for it; Conservation is rooted in the values attributed to heritage, whose understanding are the basis of authenticity; Authenticity judgements may be linked to the worth of a great variety of information sources.
2004	Natchitoches Declaration on Heritage Landscapes	U.S./ ICOMOS	Assets: Natural and Cultural values in the landscape; Heritage landscapes; Traditional practices; Living traditions and indigenous footprints. Actions:	Addresses: Historic gardens as "heritage landscapes". Recognizes: Need for a unified vision of nature and culture; Landscape as the nexus of biodiversity and cultural diversity;

			Heritage landscape protection; Transmission; Identification; Documentation; Designation; Management; Response to threats; Community engagement and stewardship; Advocacy; Promotion.	Need for heritage landscape protection at the local, national and global levels; Need for an interdisciplinary approach to identify, document, designate and manage heritage landscapes, using a holistic model.
2011	The Valletta Principles for the Safeguarding and Management of Historic Cities, Towns and Urban Areas	ICOMOS	Assets: Tangible Historic Elements; Intangible Historic Elements; Historic value; Identity and spirit of place; Authenticity; Integrity; Relationships; Social fabric and cultural diversity; Non-renewable resources. Actions: Safeguarding; Protection; Conservation; Enhancement; Coherent development; Harmonious adaptation to contemporary life; Mobility and Tourism; Management; Risk preparedness.	Addresses: Historic gardens as "green" or "open" spaces. Recognizes: Importance of public open space, and values predominantly associated with historic gardens such as identity and community participation; Need for nature-based solutions, climate change mitigation and sustainable tourism.
2011	Recommendation on the Historic Urban Landscape	UNESCO	Assets: Historic Urban Landscape; Quality of the human environment; Socio-cultural diversity; Creativity. Actions: Identification; Assessment; Conservation;	Addresses: Historic gardens as "gardens within the Historic Urban Landscape", as "built heritage", or "setting of a heritage structure". Recognizes: New pressures related to urbanization, globalization, development and the environment;

			Management; Capacity building; Research; Documenting; Understanding and presenting; International cooperation.	Historic Urban landscape approach to support development and adaptation, while retaining the characteristics and values linked to history, collective memory, and the environment using civic engagement tools, knowledge and planning tools, regulatory systems, and financial tools.
2015	The Florence Declaration on Heritage and Landscape as Human Values	ICOMOS	<u>Assets:</u> Community identity; Traditional knowledge; Quality of life; <u>Actions:</u> Sharing identity; Building knowledge and capacity; Changing perceptions; Finding frameworks; Involving, engaging and empowering local community; Using a landscape approach; Linking heritage conservation and sustainable development; Promoting accessible and inclusive technology; Standardize procedures and tools.	<u>Addresses:</u> Historic gardens as "cultural landscapes" or "cultural heritage Sites". <u>Recognizes:</u> That the landscape is a "cultural habitat, essential to cultural, socio-economic and environmental processes, as well as to the well-being of the population. Need for a bottom up, community centered approach to conservation and management; Need to abandon the artificial separation between nature and culture as well as conservation and innovation.

5.2.3.2 International Legislation

Although there is no international law that specifically protects historic gardens, they are protected as sites and landscapes because: they may be shared resourced by one or more states; they may be so important that they transcend the national interests of the host state(s), they are affected by international instruments dealing with other matters (Forster, 2014).

The UNESCO's World Heritage Convention (1972) was the first international treaty to address the protection of natural and cultural heritage, recognizing both as universally valuable to all mankind. The States Parties (194 as of 2020) (UNESCO, 2020) adhering to the convention agree to "ensure the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage…situated on its territory" (art. 4) (World Heritage Convention, 1972). The Convention defines cultural and natural heritage, establishes the intergovernmental World Heritage Committee, The World Heritage List and the World Heritage Fund. It should be noted that the Convention only recognizes and protects the internationally relevant Outstanding Universal Value (OUV), while the local community may hold other values to be equally or more important.

The European Landscape Convention of 2000, also known as the Florence Convention, addresses historic gardens at the regional level. It addresses all landscapes, not just universally valuable ones, insomuch as they are fundamental to determining "the quality of life of people everywhere" (European Landscape Convention, 2000; Phillips, 2014). It provides an important, internationally agreed upon definition for landscape: "an area, as perceived by people, whose character is the result of action and interaction of natural and/or human factors" and also formally defines landscape management as "action, from a perspective of sustainable development, to ensure the regular upkeep of a landscape, so as to guide and harmonize changes which are brought about by social, economic and environmental processes" (European Landscape Convention, 2000). Along with important definitions of landscape and landscape management, the treaty also formally defines landscape planning as "strong forward-looking action to enhance, restore or create landscapes" (European Landscape Convention, 2000, art. 1.f). According to Phillips (2014) the treaty really set the tone for heritage conservation in the new millennium: it encouraged participatory rather than expert decisions, focused on sustainability, and most of all concentrated on managing rather than preventing change. As of 2021, 40 states had signed and ratified the treaty (Council of Europe, 2021). Phillips (2014) also points out that the Convention lacks internal resources (its own secretariat and funds), and so must rely on external entities including: UNISCAPE (a university alliance); CIVISCAPE (NGOs); and ENELC (Local and regional authorities). Regarding historic gardens, he asserts that they could further benefit by participating in landscape protection at a larger scale through alliances, and new funding (Phillips, 2014).

Although no other international laws regulate historic gardens as specifically as the two mentioned above, the legal protection of historic gardens often occurs as a side effect of laws concentrating on other matters, especially natural heritage or environmental protection, cultural heritage protection and humanitarian laws. Mynors (2014) notes that few prosecutions have been filed using these laws, but this is changing as public opinion and government policy become increasingly sensitive. Thus, garden and landscape owners, managers and advocates must be informed, know when laws can aid their cause and how to plan both care and repair works in accordance with them.

International and European legislation specifically regarding natural heritage include the Ramsar Convention on Wetlands of International Importance (1971); the Bern Convention on the Conservation of European Wildlife and Habitats (1979); the Rio Convention on Biological Diversity (1992); the European Habitats Directive (Council Directive 92/43/EEC) on the conservation of natural habitats and wild fauna and flora; the 2009 European Birds Directive (Council Directive 2009/147/EC).

The Council of Europe has made Heritage conservation a priority, emanating various pertinent laws since the European Cultural Convention of 1954. Some examples relevant to historic gardens include: the Granada Convention for the Protection of the Architectural Heritage of Europe (1985), protecting European monuments and built sites; the Valetta Treaty (1992), protecting movable and immovable archeological heritage along with their land or sea context; the previously discussed European Landscape Convention (2000). At the European level, Environmental Impact Assessment law (Council Directive 85/337/EEC and subsequent revisions as amended in Directive 2011/92/EU) is the main legal instrument for enforcing the above-mentioned heritage protection policies (European Commission, 2022b). It requires environmental assessment for planning permission approval. It can assure that the cultural and environmental significance of a historic garden are assessed and valued over new developments although "where no domestic legislation applies, it is still necessary to consider whether the directive may apply by virtue of the legal doctrine of 'direct effect'" (Mynors, 2014).

Therefore, to be effective the competent authorities and the public must recognize the value of historic gardens if they are to be motivated to withhold development permissions.

Humanitarian law is also increasingly being applied to protecting the cultural landscape as heritage is most in danger in zones of conflict. Cultural and historic monuments are non-military targets and should be immune from attack. For example, the 1998 Rome Statute of the International Criminal Court explicitly calls the intentional attack of historic monuments a war crime, as well as "widespread, long-term, and severe damage to the environment" (Forster, 2014).

Table 10 reports the coding results of the sampled binding documents.

Table 10 - International Treaties Affecting Historic Garden Management

Year	Name	Entity	Key Terms	H.G. Implications
1971	Ramsar Convention on Wetlands of International Importance	The Contracting Parties, IUCN	Assets: Wetlands; Waterfowl. Actions: Designation in The List of Wetlands of International Importance; Planning; Wise use; Conservation; Wardening; Compensation for loss; Research and data exchange; Management; Training.	Addresses: Historic gardens when they include or mitigate development and pollution in a way that affects wetlands or occur in riparian and coastal zones adjacent to wetlands or islands within wetlands. Recognizes: Ecological, economic, cultural, scientific, and recreational value of wetlands; Waterfowl migrating across borders as an international resource.
1972	UNESCO's World Heritage Convention	UNESCO, States Parties, the World Heritage Committee	Assets: Cultural heritage (monuments, groups of buildings, and sites); Natural heritage (physical and biological formations, habitat, and natural sites). Actions: Identification; Protection; Conservation; Presentation; Transmission to future generations.	Addresses: Historic gardens addressed as "heritage sites", specifically "the combined works of nature and man … of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view". Establishes: World Heritage List, List of World Heritage in Danger; World Heritage protection fund; The Guidelines, which operationalize the Convention.

1979	Bern Convention on the Conservation of European Wildlife and Habitats	Council of Europe and some African Nations, Contracting parties, Standing Committee	Assets: Wild Flora; Wild Fauna; Habitat; Endangered and vulnerable species. Actions: Conservation; Maintenance; Promotion of policy and education; Taking appropriate administrative, legislative and financial measures; Encouragement and control; Having regard; Protection.	Addresses: Historic gardens as "habitat" or "sites" to consider within development and planning, to control pollution and the introduction of non-native species and promote education and the reintroduction of native species. Establishes: List of Areas of Special Conservation Interest (ASCIs) connected in the Emerald Network.
1985	The Granada Convention for the Protection of the Architectural Heritage of Europe	Council of Europe, Parties, Committee of Experts	Assets: Architectural heritage (monuments, groups of buildings and sites). Actions: Identification; Inventory; Legislation; Provision of financial support; Conservation; Promotion; Enhancement; Facilitation; Encouragement; Fostering traditional skills, materials, appropriate use and adaptation; Maintenance; Management; Developing public awareness; Exchanging information,	Addresses: Historic gardens as "sites", "the combined works of man and nature". Establishes: Requirement that the conservation, promotion and enhancement of architectural features is central in planning policies and that competent public authorities supervise and authorize schemes affecting architectural heritage and surroundings; That the appropriate adaptation and new use of properties in light of the needs of contemporary life is to be encouraged. Requirement that parties awaken and develop public awareness.

			experience and experts.	
1985 (1997, 2003, 2009, 2011, 2014)	Environmental Impact Assessment Directive (85/337/EEC, 2011/92/EU, 2014/52/EU)	Council of the European Communities, European Union	Assets: Population and human health; Biodiversity; Land; Soil; Water; Air; Climate; Material assets; Cultural heritage; Landscape; Interaction between the above. Actions: Screening; Scoping; Assessment; Informing and consulting the concerned public; Deciding development consent.	Addresses: Historic gardens as the "environment", "natural setting" or "landscape". Establishes: Definitions for "project", "developer", "development consent", "competent authority", "public" and "public concerned"; Annex I and Annex II projects; the environmental impact assessment process; Mandate for public involvement (informing and consulting) in the preliminary stages of development.
1992	Habitats Directive (92/43/EEC)	European Union	Assets: Biodiversity; Natural habitats; Species of Community interest; Sites of Community interest; Special Areas of Conservation. Actions: Conservation; Restoration; Maintenance; Listing; Management; Land-use planning; Protection; Surveillance Reporting;	Addresses: Historic gardens as "semi-natural habitat", "species habitat", "landscape features" (linear/ continuous structures and stepping stones). Establishes: Aim to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements; Natura 2000 network of protected areas including sites of Community importance (SCIs) and Special Areas of Conservations (SACs); Funding made available through Council Regulation (EEC) No 1973/92 establishing a financial instrument for the environment (LIFE).

			Study and research; Reintroduction; Public education.	
1992	1992 Rio Convention on Biological Diversity	United Nations	Assets: Biological diversity; Biological resources; Ecosystems; Habitat; Protected area. Actions: In-situ and ex-situ Conservation; Sustainable use; Fair and equitable sharing of benefits; Cooperation; Identification and monitoring; Economic incentivizing; Research and training; Educate and raise awareness; Assess and minimize adverse impacts;	Addresses: Historic gardens as "habitat". Establishes: Biological diversity is essential to functioning ecosystems; States have a sovereign right to exploit their resources and a responsibility to ensure their activities do not damage environments outside their jurisdiction.
1992	The Valetta Convention for the Protection of the Archaeological Heritage of Europe	Council of Europe, Parties	Assets: Archaeological Heritage. Actions: Institution of legal system; Inventory; Designation; Creation of archaeological reserves; Mandatory reporting, Authorization and supervision of excavations; Physical protection;	Addresses: historic gardens as "developed sites", or "context of monuments". Establishes: The conservation and enhancement of archaeological heritage as one of the goals of urban and regional planning policies; Importance of public access, in particular to archaeological sites, and educational actions to be undertaken to develop public awareness of the value of archaeological heritage.

			Reconciliation and combination with development planning; Facilitation of scientific exchange; Promotion of education and public access.	
2000	European Landscape Convention (Florence Convention)	Council of Europe	Assets: Landscape; Landscape quality. Actions: Protection; Management; Planning; Awareness raising; Training and education; Identification and assessment; Monitoring; Assistance; Exchange.	Addresses: historic gardens as outstanding landscapes. Establishes: Explicit definition of management, emphasizing sustainability; That parties must legally recognize landscapes as essential expressions of diversity and shared heritage and foundation of identity; Landscape Award of the Council of Europe.
2005	Council of Europe Framework Convention on the Value of Cultural Heritage for Society (Faro Convention)	Council of Europe	Assets: Cultural heritage; Heritage community. Actions: Recognition of public interest and value; Enhancement of value; Ensuring legislative provisions; Fostering participation; Promoting protection; Formulating integrated strategies.	Addresses: Historic gardens as cultural heritage and part of the common heritage of Europe. Establishes: That the knowledge and use of heritage is part of a citizen's right to participate in cultural life as defined in the Universal Declaration of Human Rights; That heritage is both a resource for human development, the enhancement of cultural diversity and the promotion of intercultural dialogue, and is part of a sustainable development model; That the common heritage of Europe is a shared source of remembrance, understanding, identity, cohesion and creativity.
2009	The Birds Directive (Council Directive 2009/147/EC)	European Parliament and Council of the European Union	Assets: Birds; Their eggs; Nests;	Addresses: Historic gardens as "habitat". Establishes:

			Habitats. <u>Actions:</u> Maintain populations; Preserve, maintain or re-establish habitat diversity and extent; Establish protection measures; Encourage research and work; Control introduction of non-native species; Report;	That the conservation of wild birds is a key environmental objective in the European Union; Specific measures to protect birds and their habitats, including the setting of minimum standards for the protection of birds, the establishment of an EU-wide network of Special Protected Areas (SPAs), and the prohibition of certain activities that would be detrimental to bird populations.

5.2.4 Discussion and Conclusions

One cannot examine historic garden management without first understanding the principles that define it. Indeed, it is often academics who participate in the body of experts that draft guiding and binding policy documents and interpret that policy into operational guidelines for professionals. The content analysis carried out here shows how the international body of guiding documents and legislation defining historic garden policy has evolved during the 20th and early 21st century from a monument-centered conservation approach to a landscape approach that values both tangible and intangible heritage. The 1981 Florence Charter was the first document to recognize the historic garden as a heritage monument, and provided criteria for its definition, maintenance, conservation, restoration, restoration, use, and legal and administrative protection. However, as heritage conservation policy has developed and became more articulated, the Florence Charter's "historic garden" has become part of the broader landscape view it helped develop.

To adequately address historic garden conservation, it is important that those involved are knowledgeable about both the specific aspects of historic gardens as well as the principles that guide all heritage conservation. Indeed, ICOMOS policy is meant to be understood as a continuing dialogue, where each new charter or declaration builds on those before. The founding ICOMOS document, the 1964 Venice Charter, states "the principles guiding the preservation and restoration of ancient buildings [to be understood as built heritage] should be agreed and be laid down on an international basis, with each country being responsible for applying the plan within the framework of its own culture and traditions". This founding document distinguishes between ideological, or framework, international documents that should stipulate the principles of heritage conservation and national documents that should operationalize those principles. This second document is essential to the success of the former. Many of these implementation guidelines are "living documents" that can be periodically revised and improved based on experience. They all put a strong emphasis on management as the key to continued conservation, and delineate that management into strategic, short term, long term and assessment phases.

The overview of heritage policy presented here has both theoretical and practical implications for both historic garden governance and management as well as for other categories of heritage that include both natural and cultural elements.

Theoretically, it is useful because it clearly shows how certain themes continue to be repeated in various documents. These include aims to increase the participatory governance of heritage (first appearing in the 'Nineties in the Nara Document and the 1999 revision of the Burra Charter and strongly affirmed in the 2005 Faro Convention) and to dissolve the false separation between natural and cultural heritage categories (first appearing in the 1972 World Heritage Convention and strongly affirmed by the 2004 Natchitoches Declaration on Heritage Landscapes and in the 2015 Florence Declaration on Heritage and Landscape as Human Values).

Another trend made evident by this overview is that of a generalization of heritage, which has progressed from being considered as separate properties to being seen as heritage landscapes or systems that tie together people and places and the tangible and intangible.

From a practical point of view, these policy objectives of participatory governance and holistic view of heritage still have not been entirely met. In the case of historic gardens, this entails that they are only considered as cultural heritage (as per their classification in the Florence Charter) whose value and management remains in the hands of culturally oriented experts rather than environmentally oriented experts or a wider community of stakeholders. Aside from the ethical reasons to base heritage management on participatory bottom-up processes laid out in the above-cited policy, this cultural expert-reliant management model also has significant practical limits. Especially in today's widespread climate of austerity, governments lack the manpower and resources to effectively carry it out.

From a practical point of view, it also bears asking whether the tendency towards a systemic view of heritage that is increasingly multifaceted and abstract helps or hinders policy in being relevant (i.e., in responding to the needs and challenges faced by society" as defined by Gradinaru et al., 2023). Breaking down nature-culture boundaries might allow historic gardens to benefit from wider recognition and consequentially aid their conservation, or it may cause them to blend into more general categories and thereby disappear from the policy radar altogether.

Section 5.2 References

Australia ICOMOS (2013). *The Burra Charter: The Australia ICOMOS Charter for places of cultural significance, 2013*. http://openarchive.icomos.org/id/eprint/2145/

Australia/ICOMOS (1979). *Burra Charter 1979*. https://australia.icomos.org/wp-content/uploads/Burra-Charter_1979.pdf

Bern Convention on the Conservation of European Wildlife and Habitats (1979). European Treaty Series no. 104. https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=104

Council of Europe (2021). Chart of Signatures and ratifications of Treaty 176 - European Landscape Convention. https://www.coe.int/en/web/conventions/full-list2?module=signatures-by-treaty&treatynum=176

Denyer, S. (2014). Cultural landscapes and the World Heritage Convention. In *Gardens & landscapes in historic building conservation* (pp. 321–329). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.ch32

European Commission (2022b). *Environmental Impact Assessment: Evaluating the effects of public and provate projects on the environment*. https://environment.ec.europa.eu/law-and-governance/environmental-assessments/environmental-impact-assessment_en

European Landscape Convention (2000). European Treaty Series no. 176. https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=0900001680080621

First International Congress of Architects and Technicians of Historic Monuments (1931). *The Athens Charter for the Restoration of Historic Monuments*. https://www.icomos.org/en/charters-and-texts/179-articles-en-francais/ressources/charters-and-standards/167-the-athens-charter-for-the-restoration-of-historic-monuments

Forster, M. (2014). Why Should There Be Any International Law Relating to Monuments and Cultural Landscapes? In *Gardens & landscapes in historic building conservation* (pp. 331–337). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.ch33

Funsten, C., Borsellino, V., & Schimmenti, E. (2020). A systematic literature review of historic garden management and its economic aspects. *Sustainability*, *12*(24). https://doi.org/10.3390/su122410679

Goetcheus, C., & Mitchell, N. (2014). The Venice charter and cultural landscapes: Evolution of Heritage concepts and conservation over time. *Change Over Time*, *4*(2), 338–357. https://doi.org/10.1353/cot.2014.0018

Goodchild, P. H. (2009). From the Florence Charter to the Florence Convention. In L. S. Pelissetti & L. Scazzosi (Eds.), *A 25 anni dalle Carte di Firenze: Esperienze e prospettive* (Vol. 1, pp. 181–193). Leo S. Olschki.

Habitats Directive (1992). European Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. http://data.europa.eu/eli/dir/1992/43/oj/eng

Halbrooks, M. C. (2005). The English Garden at Stan Hywet Hall and gardens: Interpretation, analysis, and documentation of a historic garden restoration. *HortTechnology*, *15*(2), 196–213. https://doi.org/10.21273/HORTTECH.15.2.0196

Harney, M. (2014a). *Gardens & landscapes in historic building conservation*. John Wiley & Sons, Ltd.Harney, M. (2014b). Introduction. In M. Harney (Ed.), *Gardens & landscapes in historic building conservation* (pp. xvx–xiii). John Wiley & Sons, Ltd.

ICOMOS (1964). *International Charter for the Conservation and Restoration of Monuments and Sites (the Venice Charter)*. https://www.icomos.org/charters/venice_e.pdf

ICOMOS (1994). *The Nara Document on Authenticity*. https://www.icomos.org/charters/nara-e.pdf

ICOMOS (2014). *The Florence Declaration on Heritage and Landscape as Human Values*. http://www.icomos.org.tr/Dosyalar/ICOMOSTR_en0034953001536912096.pdf

ICOMOS General Assembly (2011). *The Valletta Principles for the Safeguarding and Management of Historic Cities, Towns and Urban Areas: Vol. XVII*. https://www.icomos.org/Paris2011/GA2011_CIVVIH_text_EN_FR_final_20120110.pdf

ICOMOS-IFLA (1982). Historic Gardens (The Florence Charter). https://www.icomos.org/images/DOCUMENTS/Charters/gardens_e.pdf

Lithgow, K., & Thackray, D. (2009). Conservation principles in practice. *Conservation Bulletin* (Issue 60, pp. 16–19). https://nt.global.ssl.fastly.net/documents/the-evolution-of-conservation-principles.pdf

Mynors, C. (2014). Legal protection for structures, trees and wildlife. In In M. Harney (Ed.), *Gardens & landscapes in historic building conservation* (pp. 291–300). John Wiley & Sons, Ltd. Blackwell. https://doi.org/10.1002/9781118508107.ch29

Phillips, A. (2014). The international context - the European Landscape Convention. In *Gardens & landscapes in historic building conservation* (pp. 309–320). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.ch31

Ramsar Convention on Wetlands of International Importance especailly as Waterfowl Habitat (1971). https://www.ramsar.org/sites/default/files/documents/library/scan_certified_e.pdf

Rio Convention on Biological Diversity (1992). https://www.cbd.int/doc/legal/cbd-en.pdf

The Birds Directive (2009). Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. http://data.europa.eu/eli/dir/2009/147/2019-06-26

The Granada Convention for the Protection of the Architectural Heritage of Europe (1985). European Treaty Series 121. https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=121

UNESCO (2011). *Recomendation on the Historic Urban Landscape*. https://whc.unesco.org/uploads/activities/documents/activity-638-98.pdf

UNESCO (2020, October 23). *States parties*. https://whc.unesco.org/en/statesparties/

UNESCO (2021). The Operational Guidelines for the Implementation of the World Heritage Convention (WHC.21/01). https://whc.unesco.org/en/guidelines/

United Nations (2015b). Transforming our world: the 2030 Agenda for Sustainable Development. In *Resolution adopted by the General Assembly* (pp. 1–35). General Assembly. https://documents-dds-ny.un.org/doc/UNDOC/GEN/N15/291/89/PDF/N1529189.pdf?OpenElement

US/ICOMOS (2004). Natchitoches Declaration on Heritage Landscapes. https://usicomos.org/wp-content/uploads/2019/12/213natchitoches.pdf

Valletta Convention on the Protection of the Archaeological Heritage (1992). European Treaty Series, no. 143. https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=143

World Heritage Convention (1972). UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage. https://whc.unesco.org/archive/convention-en.pdf

5.3 The Appropriate Legal and Administrative Measures

The Florence Charters and Legislation Governing the Identification, Listing and Protection of Historic Gardens in Palermo, Sicily

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Restauro Archeologico, Special issue/2021(2), 152-157[3]

[3] This published article is printed here with modifications made to formatting and section numbering to harmonize with the rest of the dissertation. Its main text remains the same.

Front Matter

Abstract

40 years ago, the ICOMOS-IFLA and Italian Florence Charters canonized historic gardens as cultural heritage. However, neither document has legal force, so they are only influential if voluntarily accepted and translated into legal or administrative measures. This paper uses the city of Palermo, (Sicily) to compare the policy recommendations made in the Florence Charters to the international, Italian, regional and municipal policy that effectively governs historic gardens. Because of its autonomous privileges, Sicily governs its heritage differently than the rest of Italy, and in many ways this independence exacerbates problems in historic garden conservation and management. The COVID-19 pandemic has further accentuated these problems but has also increased the importance of these sites to the public. By looking at the Florence Charters within a wider chain of governance, this paper aims to provide insight on how the Charters could guide more effective policy downstream.

5.3.1 Introduction

The 1981 ICOMOS-IFLA Florence Charter was the first international policy document to directly address historic gardens and led the way in considering landscapes as cultural heritage (Goetcheus & Mitchell, 2014, pp. 338–357). This paper reviews the policy recommendations made in the ICOMOS-IFLA and Italian Florence Charters and compares them to the legislative and administrative measures affecting historic gardens at different governance levels. Sicily and Palermo are used as case studies because they exemplify governance problems common to many historic gardens. The global COVID-19 pandemic has put further pressure on these sites but has also increased their public value. Indeed, the National Recovery and Resilience Plan (NRRP) specifically includes the protection and promotion of historic gardens among its objectives (*Governo Italiano*, 2021, pp. 104, 108–109). By taking stock of the legal and administrative measures impacting historic gardens, this paper aims to show where kinks in the governance chain exist and suggest how the Florence Charters can better influence policy.

5.3.2 The Governance Chain – From International to Local

The Florence Charters (Table 11) are nonbinding policy documents adopted by a non-governmental organization (NGO). Such documents have no legal force, rather they are written and approved by experts to serve an advisory function (Pouperová et al., 2015, pp. 1331–1344). Nevertheless, by codifying terms, deontology, and best practices then adopted by authorities, they may have socially normative effects.

Table 11 - The International and Italian Florence Charters and their Policy Recommendations

	ICOMOS/IFLA Florence Charter	Italian Florence Charter
Authors	Interdisciplinary group of experts in the International Committee for Historic Gardens	Italian experts from the Italian ICOMOS branch present at a round table discussion
Date written	21/05/1981	12/09/1981
Date adopted	15/12/1982	-
Structure	Preamble; Definitions and Objectives (artt. 1- 9); Maintenance, Conservation, Restoration and Reconstruction (artt. 10 - 17); Use (artt. 18 – 22); Legal and Administrative Protection (artt. 23 – 25); Nota bene	Principles of Conservation (nn. 1-4); Recommendations (nn. 1-11).
Definition of "historic garden"	An architectural and horticultural composition of interest to the public from a historical or artistic point of view (art. 1); An architectural composition whose constituents are primarily vegetal and therefore living (art. 2).	Includes house, palace and villa gardens; parks; botanical gardens; archaeological areas; green spaces in historic urban centers, etc. (prin. 1); A multi-material ensemble, designed by man, made in great part with living material, which insists on (and modifies) an anthropic area, a natural context (prin. 1); A material artifact, a work of art and, as such, cultural heritage, an architectural and environmental resource, and patrimony belonging to the entire community that benefits from it (prin. 1).
Policy recommendations	Authorities must adopt legal and administrative measures for their identification, listing and protection (art. 23); Land-use, regional and local planning documents must provide for their preservation (art. 23); Authorities must adopt financial measures that will facilitate the maintenance, conservation and, where necessary, the reconstruction of historic gardens (art. 23); The most outstanding of the historic gardens shall be proposed for inclusion in the World Heritage List (art. 25).	Extension of tax concessions for historic architecture to tree specimens (rec. 1); Exclusion of public gardens in historic centers from urban planning standards (rec. 2); Cultural heritage law should be reformed so that [historic gardens] are recognized as worthy of protection by Regulatory Plans, even if not yet protected as listed heritage (rec. 3); Establishment of a special office within the Ministry of Culture and the Environment to oversee their identification and cataloging, and to document and coordinate all protection and planning operations in collaboration with universities and other Entities (rec. 4); To require a specific expense item for the maintenance of historic gardens in the budgets of the national and local governments (rec. 5); To require a garden expert be part of all urban and territorial planning commissions (rec. 8); To establish a public registry of historic gardens (rec. 11).

These binding measures are issued by different levels of government, defined by their geographic scale and by whom they hold accountable. Thus, governance can be viewed like a supply-chain, with each level delivering policy to the one below (Figure 8).

Figure 8 - The Governance Chain

The international level involves intergovernmental organizations (IGOs), which have the authority to emanate treaties between sovereign states. While the World Heritage List, a product of the United Nations Educational, Scientific and Cultural Organization (UNESCO)'s 1972 World Heritage Convention, is mentioned in the Florence Charter, other important IGO treaties have been written since. The most important is the European Landscape Convention (2000), which standardizes landscape governance definitions, focuses on guiding dynamic processes towards sustainability and encourages participatory rather than expert decision-making.

The next governance level is national. In Italian law, the Cultural and Landscape Heritage Code (Law no. 42/2004 and modifications) explicitly protects historic gardens as both cultural and landscape heritage. It defines procedures for the verification and declaration of cultural significance, specifies and strengthens requirements for landscape planning, and gives Regional Landscape Plans precedence above other planning measures (Ferrucci, 2012, pp. 241–247). However, many Regions have had problems producing the required plan (De Bonis et al., 2016, pp. 3–4). National government also directs internally or externally sourced financial resources or incentives such as EU and NRRP funding.

Next comes regional governance, i.e., Sicily. Because the Island has special autonomous privileges, its cultural heritage and landscape administration is enforced by the Sicilian Regional Office for Culture, which has "exclusive competence" to create policy, oversee Superintendent Boards, and allocate funding (Mignosa, 2002, pp. 20–30) and thus no obligation to communicate its catalogued historic parks and gardens (CRicd, 2022) to the National Cultural Ministry's General Catalogue (*Ministero della Cultura* & ICCD, 2022a) or to follow the Heritage Code's procedure for Regional Landscape Plans. Instead, Sicily has its own Territorial Landscape Plan, which fragments the island into 18 geomorphologically determined areas, each with its own conventions and state of approval (Trombino, 2018a, p. 54). The Guidelines for this Territorial Landscape Plan were drafted in 1996[4], and thus are based on obsolete national laws. Better landscape planning is direly needed in Sicily; the peri-urban and coastal areas most at risk (Giampino, 2018, p. 27) are exactly where many historic gardens are located. Instead of improving matters, the Region's latest landscape planning reforms have proposed alarming divergencies and loopholes, causing them to be rejected by the national government (Filippone, 2021).

In the past, the provinces governed at the sub-regional level, and were responsible for intercity services and infrastructure. However, Regional Laws no. 7/2013 and no. 8/2014 complicated matters by substituting them with 'Metropolitan Cities' and 'Free Consortiums of Municipalities', whose role still remains unclear.

The last link in the governance chain is the municipal level, which uses policy instruments defined by Italian Urban Planning Law no. 1150/1942, and successive modifications.[5] Its main instrument is the General Municipal Regulatory Plan, which analyzes and regulates land-use. Regional law no. 15/1991 and no. 9/1993 require Sicilian municipalities to adopt and approve a municipal plan, which must be then approved by the Regional Land and Environment Office. However, it often takes municipalities over a decade to issue an updated plan due to insufficient resources and building rights disputes (Trombino, 2018b, p. 49). Palermo's current plan was approved in 2002 and revised in 2004. It protects historic gardens under the zoning classification 'Historic Green Spaces', which also includes urban parks, urban greenery and agricultural areas (*Città di Palermo Settore Urbanistica*, 2004c). A total of 291 Historic Green Spaces are listed, 86 of which are historic parks or gardens (*Città di Palermo Settore*

[4] Approved with Assessorial Decree no. 6080/1999.

[5] Received with Sicilian Regional Law no. 71/1978.

Urbanistica, 2004a). The municipal plan's implementation norms govern how these spaces can be used, permitting touristic, agricultural and horticultural activities that don't change the original layout or materials (*Città di Palermo Settore Urbanistica*, 2004b). Palermo's municipal government also emanates other deliberations and acts (*Città di Palermo - Settore Ambiente e Territorio*, 2008) that regulate how historic gardens are managed day-to-day, but these have been irregularly applied.

While the general policy recommendations made in the ICOMOS-IFLA Florence Charter are addressed at the national level by the Heritage Code, they aren't addressed at all by regional government, which hasn't been able to take advantage of Sicily's special autonomy to list, plan, or finance its historic gardens. Palermo's municipal government has done a better job in listing and including historic gardens in planning documents but has also fallen short in adopting the financial measures necessary to assure their upkeep. Thus, gardens are 'preserved' in a state of decay, but not really conserved at all. Regarding the Italian Charter, many of its more specific policy recommendations still need to be followed up. Indeed, the Italian Charter's main problem has been that of diffusion (Scazzosi, 2017, pp. 123–125).

Table 12 summarizes the progress and shortfalls made at each level of historic garden governance and Table 13 offers a to-do list for each governance level, organized according to the ICOMOS-IFLA Charter's general policy recommendations and considering the suggestions made in the Italian Charter.

Table 12 - Evaluation of Governance at Different Levels

	Progress	Shortfalls
International	• The Florence Charter is well known, especially in Europe, and has impacted binding and non-binding policy at various levels; • Many UNESCO World Heritage Sites are gardens or contain gardens; • The CoE Landscape Convention establishes important landscape definitions and practices.	• The Florence Charter has been applied differently throughout the world; the Italian Charter is not well-known; • UNESCO doesn't always promote World Heritage gardens, e.g., gardens in Palermo's Arab Norman World Heritage Site; • The CoE Landscape Convention has proven difficult to enforce and put into practice.
National (Italy)	• The 1939 Bottai and 1985 Galasso Laws and the 2004 Cultural and Landscape Heritage Code establish measures to identify, list, and protect historic gardens through protection measures and landscape planning; • 2021 NRRP directly addresses historic gardens and will provides 0.3 billion euro for «identity sites, peri-urban areas, parks and historic gardens» to improve their maintenance, management and fruition.	• The quality and comprehensiveness of heritage lists may vary from Region to Region and Landscape Plans are still not produced by many Regions; • Governing authorities may lack the necessary data, knowledge and skills to distribute the 2021 NRRP funds effectively.
Regional (Sicily)	• 32 historic parks and gardens are listed in the Regional Heritage Catalogue, mostly thanks to 2000-2006 European Union structural funds; • Some sub-regional and sectorial planning documents have also been developed.	• The 32 catalogued Sicilian Heritage sites don't represent the whole territory, and have not been updated since 2007; • The Regional Catalogue Office does not coordinate with the National Ministry of Culture to

		insert its heritage in the National Register, where currently no Sicilian gardens are present; • Landscape planning only uses restrictive command and control measures, rather than strategic projects and financial incentives, and is increasingly erratic and uncoordinated.
Sub-regional (Provinces, etc.)	• Provinces were responsible for communicating information to the Regional Superintendent Boards and for the 'Coordinating Territorial Plan' regarding intercity services and infrastructure.	• The abolition of the provinces has thrown sub-regional landscape planning into chaos.
Local (Palermo)	• Palermo's 2002/2004 General Regulatory Plan contains a comprehensive list of protected historic parks and gardens; • The Plan addresses appropriate use; • The management of historic gardens is addressed in the *Regulations for public and private green areas of the city of Palermo* (City Council Deliberation 355/2008), which favors the involvement of non-profit associations in green space management and proposes a "Green Atlas" containing all of the maps and planning information necessary to manage Palermo's Parks and Gardens.	• Many of the publicly owned gardens on the list are abandoned and closed; • Allowed uses for 'Historic Green Areas' are mainly horticultural and don't support visitor services; they may be seen as suffocating and punitive by owners; • Although originally comprehensive and well written, the 2008 Regulations are now outdated and the Municipality currently lacks the resources to carry them out satisfactorily; • The associations that are allowed to take over management responsibilities are not vetted for qualifications or supported; • No such "Green Atlas" is in use by the public administration.

Table 13 - Historic Garden Policy Recommendations

1981 Florence Charter recommendations	Policy recommendations for the future
Authorities must adopt legal and administrative measures for [historic garden] identification, listing and protection (art. 23)	NGOs and IGOs should name historic gardens in cultural heritage policy documents as a special category of designed cultural landscape heritage with important connections to identity, wellbeing and sustainability.
	The Italian Ministry of Culture should increase the number of historic parks and gardens in their Heritage Catalogue and continue to develop it as both as a reference and outreach tool. The Ministry of Agriculture, Food and Forestry's Register of Monumental Trees should be cited in historic park and garden entries.
	The Sicilian Heritage Catalogue Office must give the Ministry of Culture the necessary documents to include their catalogue entries in the national Heritage Catalogue. New sites should be added, using municipal historic green space lists, expert consultations and participatory processes to prioritize which sites to catalogue. The list should represent gardens distributed throughout the Island. More should be done to facilitate use of the Regional Catalogue as a reference and promotional tool.
	An updated version of Palermo's Green Area Regulations should be issued, along with the 'Green Atlas'. Citizens, associations, and institutions should be involved in maintaining it. Individuals or Associations involved in the management of public historic parks and gardens should have clearly defined responsibilities and appropriate qualifications and a special effort should be made to involve students and landscape professionals.
Land-use, regional and local planning documents must provide for [historic garden] preservation (art. 23)	NGOs and IGOs should continue to consider historic gardens in planning guidelines. The CoE Landscape Convention and Guidelines should continue to be promoted, along with its associated professional and educational networks.
	Landscape planning education should be offered and promoted in Italian Universities so that the necessary human resources are available to draft landscape plans and enact participatory processes. Regions should be supported in fulfilling the 2004 Heritage Code's landscape planning requirements.
	The Sicilian Regional Office for Culture should adopt landscape planning guidelines that follow national law (i.e., the 2004 Heritage Code). Government offices responsible for cultural heritage and landscape planning need to include historic garden experts and to communicate and coordinate effectively.
	Palermo's new General Regulatory Plan should continue to list and protect Historic Green Areas, updating the 2004 list. Allowed uses should include visitor services.
Authorities must adopt financial measures that will facilitate the maintenance, conservation and, where necessary, the reconstruction of historic gardens (art. 23)	The European Union should allocate funding for historic gardens, promoting them as important elements of European identity. Traditional horticultural skills and garden curatorship should also be promoted.
	2021 NRRP and other funding meant for historic gardens should be distributed based on equity, efficiency, and project sustainability. Investments should be monitored and evaluated through management planning and cost-benefit analysis. Educational institutions should form historic garden professionals, while

	authorities should promote such courses and establish hiring criteria that rewards study and training.
	The restoration and promotion of the many publicly owned historic gardens that are abandoned should be prioritized. If the Sicilian Region does not have the resources to open and care for its sites, it should form public/private partnerships that assure long-term quality conservation, management and public fruition.
	Municipal historic parks and gardens should have their own budget. Employment of highly skilled gardeners and horticultural professionals should be prioritized and current employees should be awarded for improving skills and knowledge and demonstrating excellence. Regularity of care should be assured with well-organized work schedules and clearly attributed, long-term responsibilities.
The most outstanding of the historic gardens shall be proposed for inclusion in the World Heritage List (art. 25)	'Park or garden' should be a search criterion on the Heritage List website and historic gardens should be emphasized when they are a component of larger sites. The Designed Landscape guidelines discussed in the 2016 ISCCL Statement on the Workshop of the Florence Charter should be somehow incorporated into the Operational Guidelines for the World Heritage Convention.
ALL POLICY LEVELS ALONG THE CHAIN MUST COMMUNICATE AND COORDINATE BETTER WITH GOVERNING BODIES ABOVE AND BELOW	

5.3.3 Conclusions

In order to move forward from the measures governing historic gardens with mediocre results at best, lawmakers and administrators need clear guidance. Experts have agreed that the original ICOMOS-IFLA Florence Charter should be preserved as a historic document within the ICOMOS canon but that new guidelines are needed that connect historic gardens to the broader issues of landscape quality, sustainability and wellbeing (Goodchild, 2009; Zangheri, 2009, pp. 167–169). In 2016, the statement issued after the ICOMOS-IFLA International Committee on Cultural Landscape's workshop in Bath proposed the creation of such guidelines in the form of a living document that would emphasize historic gardens' position in the broader category of designed cultural landscapes (Scazzosi, 2017, pp. 123–125). The ICOMOS-IFLA Document on Historic Urban Parks was also added in 2017 (ICOMOS-IFLA, 2017), opening the door for future considerations regarding historic garden subcategories.

The Italian Charter was written to protest the ICOMOS-IFLA document's definition of historic gardens, allowances for reconstruction and as a 'promise' to continue to work on the issue (Bardeschi, 2009, p. 160). It already defines historic gardens in more holistic and dynamic terms than the international charter and remains less at odds with current landscape and heritage thought. As the policy synopsis has shown, Italy would be well served by a revival of its own Charter, sensitive to national, regional and local issues. Increasing the Italian Charter's on-line presence would greatly improve its accessibility. Using a more participatory process to periodically revise the document involving national, regional and especially local authorities, as well as NGOs, would assure that its recommendations are understood, shared and feasible for those on the front lines.

Section 5.3 References

Bardeschi, M. D. (2009). Salviamo il patrimonio del passato, ma i nuovi giardini del terzo millennio dove sono? In L. S. Pelissetti & L. Scazzosi (Eds.), *Giardini Storici, a 25 anni dalle Carte di Firenze: Esperienze e prospettive*. Leo S. Olschki.

Città di Palermo - Settore Ambiente e Territorio (2008). *Regolamento del Verde Pubblico e Privato*. https://www.comune.palermo.it/js/server/uploads/regolamenti/_05032019104609.pdf

Città di Palermo Settore Urbanistica (2004b). *Norme tecniche di attuazione, adeguate alla errata corrige*. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_20122013095758.pdf

Città di Palermo Settore Urbanistica (2004c). *Variante Generale al P.R.G., Relazione Generale*. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_14052014162916.pdf

Città di Palermo Settore Urbanistica. (2004a) *Elenco Verde Storico adeguati ai D.Dir. 558 e 124/DRU/02 di approvazione*. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_09012014121349.pdf

CRicd (2022). *Catalogo Beni Culturali della Regione Siciliana*. https://catalogobeni.cricd.it

De Bonis, L., Gisotti, M. R., & Masoni, R. (2016). *La pianificazione paesaggistica in Italia: Stato dell'arte e innovazioni: Vol. (Territori; 26)* (A. Magnaghi, Ed.). Firenze University Press.

European Landscape Convention (2000). European Treaty Series no. 176. https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=0900001680080621

Ferrucci, N. (2012). I Giardini storici ed il paesaggio. *Diritto e Giurisprudenza Agraria, Alimentare e dell'Ambiente*, *IV*, 241–247.

Filippone, T. (2021, April 13). Legge urbanistica, Sicilia bocciata da Roma per la seconda volta. *Repubblica*. https://palermo.repubblica.it/politica/2021/04/13/news/legge_urbanistica_sicilia_bocciata_da_roma_per_la_seconda_volta-296319599/

Giampino, A. (2018). Consumo di suolo. In I. Vinci & P. la Greca (Eds.), *Sicilia: Rapporto sul territorio 2018: Vol. Urbanistica Dossier* (016 ed., pp. 27–30). INU Edizioni.

Goetcheus, C., & Mitchell, N. (2014). The Venice charter and cultural landscapes: Evolution of heritage concepts and conservation over time. *Change Over Time*, *4*(2), 338–357. https://doi.org/10.1353/cot.2014.0018

Goodchild, P. H. (2009). From the Florence Charter to the Florence Convention. In L. S. Pelissetti & L. Scazzosi (Eds.), *A 25 anni dalle Carte di Firenze: Esperienze e prospettive* (pp. 181–193). Leo S. Olschki.

Governo Italiano (2021). *Piano Nazionale de Ripresa e Resilienza (PNRR)* (pp. 1–269). https://www.governo.it/sites/governo.it/files/PNRR.pdf

ICOMOS-IFLA (2017). Document on Historic Urban Parks. In *GA2017_6-3-2_HistoricUrbanPublicParks_EN_final20170730.pdf*. https://www.icomos.org/images/DOCUMENTS/General_Assemblies/19th_Delhi_2017/Working_Documents-First_Batch-August_2017/GA2017_6-3-2_HistoricUrbanPublicParks_EN_final20170730.pdf

Mignosa, A. (2002). The organization and finance of cultural heritage in Sicily. In I. Rizzo & R. Towse (Eds.), *The economics of heritage, a study in the political economy of culture in Sicily* (pp. 20–30). Edward Elgar Publishing Limited.

Ministero della Cultura, & ICCD (2022). *Catalogo generale dei beni culturali*. https://www.catalogo.beniculturali.it/

Pouperová, O., Dienstbier, F., & Vícha, O. (2015). International documents on landscape restoration. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *63*(4), 1331–1344. https://doi.org/10.11118/actaun201563041331

Scazzosi, L. (2017). Verso una nuova carta internazionale sui guardini. *Ananke Firenze*, *80*, 123–125.

Trombino, G. (2018a). La pianificazione paesaggistica. In I. Vinci & P. la Greca (Eds.), *Sicilia: Rapporto sul territorio 2018: Vol. Urbanistica Dossier* (16 ed., pp. 53–58). INU Edizioni.

Trombino, G. (2018b). La pianificazione urbanistica comunale. In I. Vinci & P. la Greca (Eds.), *Sicilia: Rapporto sul territorio 2018: Vol. Urbanistica Dossier* (16 ed., pp. 49–52). INU Edizioni.

Zangheri, L. (2009). Documenti, esperienze e strumenti di conservazione: Bilancia a 25 anni dalle Carte di Firenze. In L. S. Pelissetti & L. Scazzosi (Eds.), *A 25 anni dalle Carte di Firenze: esperienze e prospettive: Vol. I* (pp. 167–169). Leo S. Olschki.

* Italian text and terms were translated into English by the authors.

5.4 The Italian National Recovery and Resilience Plan (NRRP) Investment Program for Historic Parks and Gardens

5.4.1 Introduction

Financial incentives are non-punitive ways to stimulate the maintenance, restoration and renewal of public amenities to ensure that they continue to thrive by lowering the perceived investment risks and transaction costs of owners and managers (Rizzo in Towse 2002, p. 35). In a scenario that recalls the birth of the Public Park Movement in the Global West during the 19th century, recent health, environmental and economic crises have led Italy to put forward a new policy measure specifically for historic parks and gardens as part of its National Recovery and Resilience Plan (NRRP). It boasts being the first truly systematic policy measure for the requalification of Italy's historic parks and gardens and aims to extensively catalogue and recover Italy's patrimony of historic gardens and assure their proper maintenance, management, and public fruition. According to the NRRP, Italy has about 5,000 protected villas, parks, and gardens, most of which are accessible public property and in a critical state of deterioration. The investment program means to provide resources to regenerate these places and to train local personnel to care for and preserve them in the future (*Governo Italiano*, 2021).

This section summarizes the development of the NRRP, showing how it fits into the wider framework of European policy. It also describes the specific measure for the requalification of Italy's historic parks and gardens. The stated objectives of this measure show a turn from monument centered heritage policy such as the Florence Charter, to sustainability centered heritage policy focusing on how natural and cultural and heritage benefits people and their environment. While the former concentrates on protecting heritage properties, the second concentrates on actualizing potential benefits by promoting fruition.

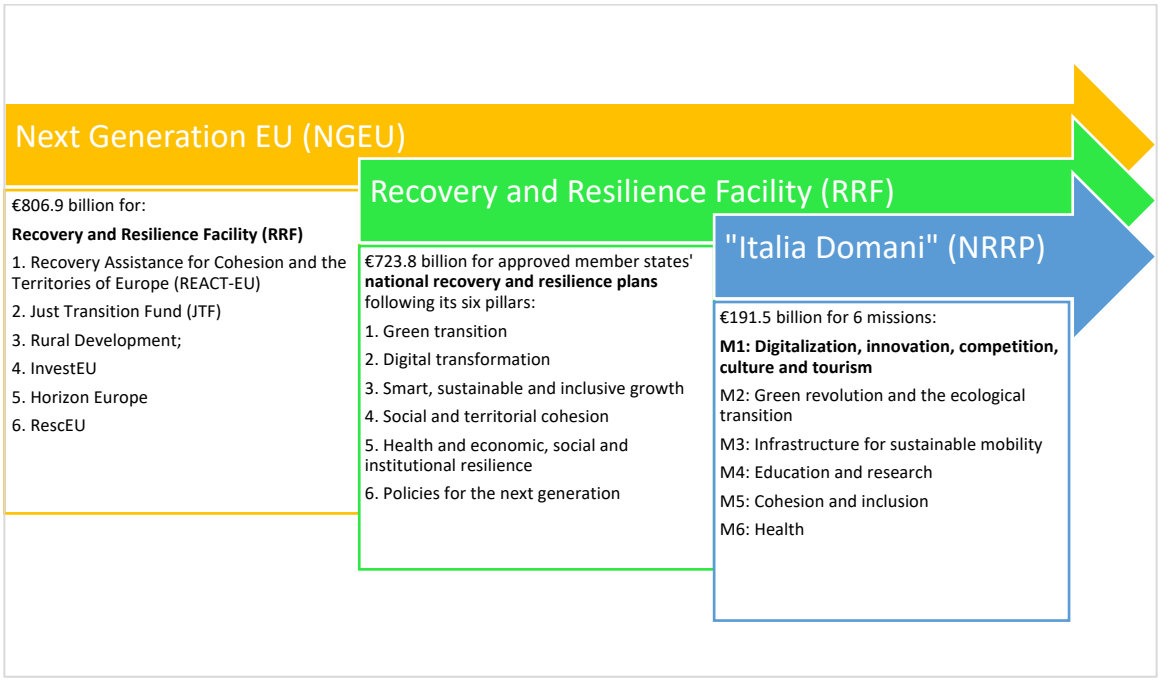
5.4.2 Development of the NRRP

Called "*Italia Domani*", or Italy tomorrow, the NRRP (*Governo Italiano*, 2021) is a reform and investment plan meant to stimulate the nation's economy after the COVID-19 pandemic and to facilitate sustainable and inclusive economic development. It is part of the wider European Union's recovery project, Next Generation EU (NGEU), proposed by the European Commission on May 27th, 2020, and agreed upon by EU heads of state during the European Council held on July 21st, 2020, (*Governo Italiano*, 2021). The NGEU budget includes 806.9 billion euros in resources to boost the growth, investment, and reforms of European Union Member states, with about half of the resources distributed in direct grants and the rest as loans (European Commission, 2022e).

The largest component of the NGEU is the Recovery and Resilience Facility (RRF), which entered into force on February 19th, 2021, to finance the reform and investment plans of Member States from February 2020 until the end of December 2026 (European Commission, 2022d). The Interministerial Committee for European Affairs sent governments a guideline for preparing their national recovery and resilience plans in September 2020 (*Governo Italiano*, 2021).

Figure 9 shows a cascade diagram leading from the broadest European Union financial recovery program, the NGEU, to Italy's NRRP.

Figure 9 - Cascade Diagram of European Union Measures Leading to Italy's NRRP*



* Policy instruments relating to historic parks and gardens are in bold text.

Once the Italian Parliament officially invited the Italian Government to prepare the plan, national and regional stakeholders from private and governmental sectors were involved in its preparation (European Commission, 2022c), which was carried out in collaboration with the European Commission. A first draft of Italy's NRRP was presented to the Council of Ministers on January 12th, 2021, and examined and revised by Parliament on March 31st, 2021, (*Governo Italiano*, 2021). The revised version of Italy's NRRP was then presented to regional institutions, political authorities and civil society and formally submitted to the European Commission in April 2021 (*Governo Italiano*, 2021).

Italy's NRRP was endorsed by the European Commission on June 22nd, 2021, who decided that it adequately addresses the RRF's six pillars (green transition; digital transformation; economic cohesion, productivity and competitiveness; social and territorial cohesion; health, economic, social and institutional resilience; policies for the next generation), as well as the country-specific challenges identified in the European Semester, the European Union's surveillance and coordination instrument for members' fiscal, economic and employment problems. Implementation of the plan's reforms and financing began after it was adopted by the European Council on July 13th, 2021, (European Commission, 2022c).

5.4.3 Allocated Resources, Transversal Objectives, and Structure of the NRRP

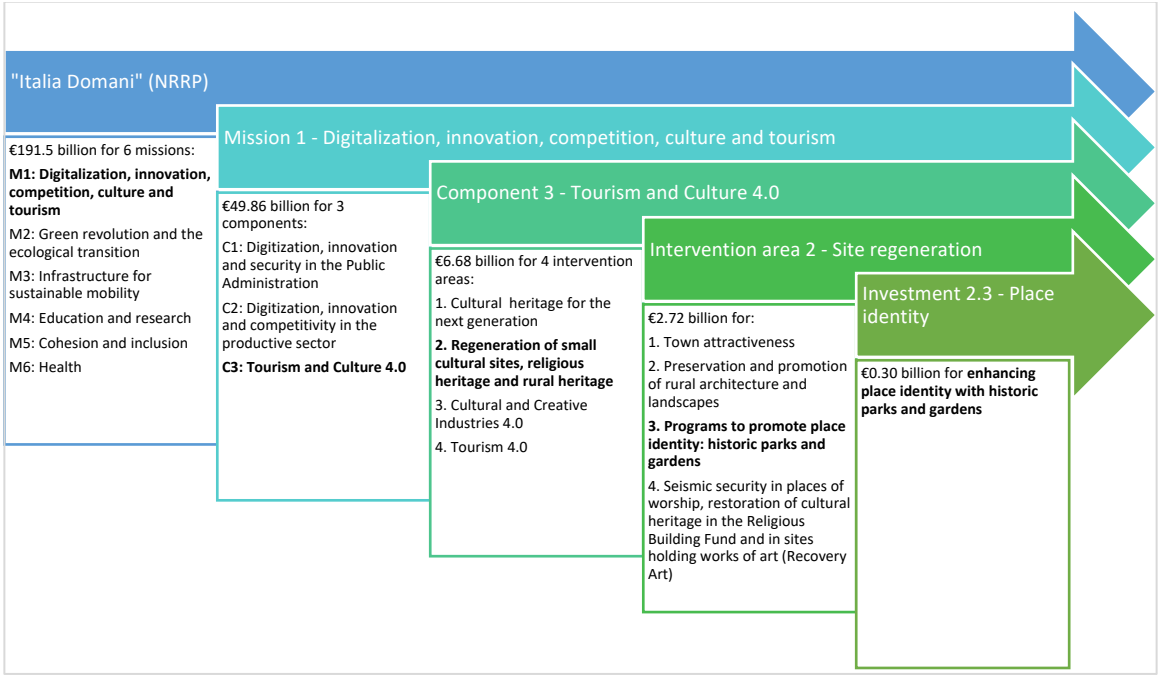
Italy's NRRP allocates a total of €235.12 billion in resources. €191.50 billion come from the RRF, of which Italy is the largest beneficiary (European Commission, 2021, 2022f), with € 68.9 billion distributed in grants and €122.6 billion distributed in loans (European Commission, 2022c). An additional €13 billion come from the Recovery Assistance for Cohesion and the Territories of Europe fund (React-EU), which is also part of NGEU. Finally, €30.62 billion come from a specific fund instituted by the Italian government to integrate the NRRP (*Decreto-legge* no. 59, 06/05/2021).

These resources are meant to work together with reforms to stimulate Italy's economic recovery while at the same time addressing the challenges and opportunities of the green and digital transitions, as well as economic and social resilience including social and territorial divides present in Italy (European Commission, 2022c). In fact, 37.5% of resources are meant for projects supporting the climate objectives laid out in European Green Deal, a policy initiative approved by the European Commission in 2020 aiming to make the European Union climate neutral by 2050 (European Commission, 2022a). The NRRP also follows the principle that interventions must "do no significant harm" (*Commission Notice C/2021/1054*; *Regulation EU 2020/852, art. 17*).

25.1% of the resources address the digital transition by increasing connectivity through the deployment of high connectivity networks, incentivizing the adoption of technology and training in the Italian production system, and supporting the digitization of the Italian public administration through both reforms and investments (European Commission, 2022c). Finally, the NRRP aims to address economic and social resilience through reforms and investments reducing social and territorial inequalities, paying special attention to people with disabilities, youth, women and the "*Mezzogiorno*", Italy's historically depressed South. Indeed, the NRRP aims to spend 40% of its total resources there (European Commission, 2022c).

The NRRP's three strategic axes are spread throughout 6 missions that are loosely based on the RRF's six pillars but adapted according to Italy's specific needs and challenges. These missions are then broken down into a total of 16 components, which are then subdivided into intervention areas, and finally into a total of 151 specific investments (*Governo Italiano*, 2021; *Italia Domani*, 2022a). Figure 10 shows a cascade diagram from the most general category of the missions to the specific investment program in historic parks and gardens.

Figure 10 - Cascade Diagram of Measures within Italy's NRRP Leading to Investments in Historic Parks and Gardens*



* Policy instruments relating to historic parks and gardens are in bold text.

As Figure 10 shows, the NRRP investment in historic parks and gardens (M1C3.2.3) is part of component 3, Tourism and Culture. According to the NRRP, Tourism and culture are crucial

parts of Italy's identity, both from the point of view of its citizens and for the international community. Furthermore, the strategic priorities connected to the conservation and promotion of cultural heritage are seen as being in perfect synergy with its pillars. For example, heritage conservation is based on intrinsically ecological policies that limit land loss and the tourism and the cultural sectors contribute substantially to the country's economy, with the largest impact on female and youth employment (*Governo Italiano*, 2021). The NRRP also asserts that all four intervention areas within component 3 should depend on strong cooperation between central, regional, and local levels of government and that private entities and civil society should also be involved by incentivizing sponsorships and multi-level forms of government. The NRRP cites two guiding policy references: 1) the Faro Convention on the value of cultural heritage to society; 2) the European Framework for Action on Cultural Heritage, which calls for promoting integrated and participatory approaches to generate benefits in the four pillars of sustainable development: the economy, cultural diversity, society, and the environment (*Governo Italiano*, 2021).

The next more specific NRRP category containing the historic park and garden investment is intervention area 2, "Regeneration of small cultural sites, religious heritage and rural heritage". The reasoning behind this intervention area is that most Italian tourism flows towards internationally renowned "attractors" creating an unbalanced situation where some sites are degraded by over-use and other places of great artistic or cultural value remain unvisited (*Governo Italiano*, 2021). Thus, this intervention area aims to strengthen smaller and rural sites so that tourism flows are more sustainably distributed.

5.4.4 Investment M1C3.2.3: Historic Parks and Gardens

The specific investment in historic parks and gardens aims to improve quality of life by promoting the regeneration of historic parks and gardens so that they function as hubs of public beauty, place identity for urban communities and as key factors in urban regeneration (*Governo Italiano*, 2021, p. 108). To do so, €300 million is budgeted for the program. The program contributes to the NRRP's transversal principles of supporting climate and digital transitions, the principle of gender equity and the obligation of protecting and enhancing the quality of life of young people (*Ministero della Cultura*, 2021).

Foreseen impacts include the provision of resources to make historic villas, parks, and gardens more inclusive and attractive; the provision of resources for training local staff to preserve and care for historic parks and gardens over time; the reduction of environmental pollution and noise; the regulation of the microclimate; the production of oxygen (*Italia Domani*, 2022b).

Progress and success of all NRRP reforms and investments are measured through milestones and targets. Milestones are defined as qualitative goals to be reached through a specific measure (i.e., reform or investment) and targets are defined as quantitative goals that can be measured with a specific indicator. Both represent a commitment agreed upon at the European Union or national level (*Ministero della Cultura*, 2021).

The Ministry of Culture was given the deadlines of assigning resources to sites (milestone M1C3-18) by June 2022 (target T2 2022), and of verifying that works are completed in at least 40 historic parks and gardens and at least 1,260 workers having been trained (milestone M1C3-18) by December 2024 (target T4 2024) (*Italia Domani*, 2022b; *Ministero della Cultura*, 2021).

5.4.5 Grant Application Documents, Procedures, and Winners

The €300 million budgeted for the program is divided up into:

- €100 million for 5 parks chosen directly by the Ministry of Culture;

- €10 million for cataloguing and for training master gardeners;
- €190 million to finance grants awarded through a public competition.

The first two components were allocated directly by government offices while the latter was distributed through a public application procedure. Its resources were to finance projects regarding:

- Maintenance, replacement or management of the growth of vegetal components;
- Restoration of the architectural and monumental components that are currently present (small buildings, fountains, furniture, etc.);
- Interventions ensuring accessibility and safety, such as the installation of fences, entrance gates, or video surveillance systems;
- Implementation of informative aids (interpretation) such as signage and guides to promote knowledge and conscious public use;
- Other actions promoting cultural, educational and recreational use.

The public call for the grant application distributing a total of 190 million euro was issued by the Ministry of Culture's General Secretary on December 20th, 2021, (*Ministero della Cultura*, 2021). It was also accompanied by a memo establishing guidelines and technical standards for the restoration of all historic gardens prepared by a working group made up of members of the Ministry of Culture and by the Association of Parks and Gardens of Italy (APGI). A standardized and updated guideline for historic garden restoration in Italy has been necessary for some time, perhaps since an Italian group drafted an "alternative" Florence Charter that was never truly formalized (Funsten et al., 2021). In any case, both the international and Italian Florence Charters limited themselves to ideological guidelines and did not go into technical and practical details. Conversely, the new, over 200-page technical guide goes into much greater depth. It is a revision of a special tender specifications drafted in 2000 during the VI International Congress on Historic Parks and Gardens by a committee of experts, interested government officials and members of the Cultural Ministry. The document wasn't officially adopted and sat on the shelf until the institution of APGI in 2011. Since its beginning, APGI has a formalized partnership with the Cultural Ministry, which was renewed and strengthened by a Convention signed by the Secretary General in 2020. Meanwhile, work on a revised version of the 2000 special tender specifications had begun in 2019, which became the guidelines published online with the grant application. The guidelines cover all phases of historic garden research regarding both living plant and architectural components, from preliminary surveying, research and analysis, excavations and technical testing, materials, planting, and construction works, and maintenance (Canestrini et al., 2021).

The public notice for the competitive grant application opened on December 30th, 2021, and closed on March 15th, 2022. All owners, possessors, or holders of public or privately owned parks and gardens of cultural interest (artistic, historical, botanical, landscape) could apply, provided that the interested sites were protected by an express order under Legislative Decree 42/2004 or under previous legislation, i.e., Law 364/1909, Law 778/1922, Law1089/1939, or Legislative Decree 490/1999 (*Ministero della Cultura*, 2021).

The grant announcement (*Ministero della Cultura*, 2021) states that grant winners were to be chosen through a point system based on criteria established by a technical and scientific steering committee made up of representatives from the Cultural Ministry, Italian universities, the National Association of Italian Municipalities, and other sectorial associations nominated by Decree of the General Secretary no. 874 of October 15th, 2021. Projects not complying with the principle of "do no significant harm" (*Commission Notice C/2021/1054*) and other EU and national environmental legislation were to be automatically excluded from the competition.

The implementing parties of selected projects must also sign a convention lasting at least 10 years in which public access is guaranteed on prescribed national heritage, garden, and landscape open days as well as on a declared number of ordinary days. Gardens must also guarantee an elevated standard of maintenance and visitor reception through a management plan submitted with their project proposal. The grant announcement also states that 20% of the grant resources must be allocated to sites in Italy's *Mezzogiorno*, i.e., the regions of Abruzzo, Molise, Campania, Basilicata, Apulia, Calabria, Sicily and Sardinia. The other 20% of M1C3.2.3 resources for southern regions should be part of the €100 million investment for five state-owned parks chosen directly by the Ministry of Culture.

The distribution of the program's resources was decided during the summer of 2022.

The five parks chosen directly by the Ministry of Culture were announced on June 21st, 2022, and included three sites in the region of Campania (the Reggia di Caserta, the Reale Bosco di Capodimonte, and Villa Favorita Ercolano), one site in Lazio (Villa Lante) and one site in Veneto (Villa Pisani), for a total cost of €97,993,178.00 (*Ministero della Cultura*, 2022c).

The projects admitted to the grant competition were also announced on June 21st, 2022, with a revision adding two more projects announced on January 12th, 2023, (*Ministero della Cultura*, 2023). According to this latest list of admitted applicants, 814 projects from all over Italy met the admittance standards with projects costing a total of €1,056,185,537.85, more than five times the €190 million available.

Of these, 129 projects were selected for a total cost of €189,831,935.13. 106 of these projects were selected from northern and central Italy costing €151,554,129.30 and 23 projects were selected from southern Italy costing €38,277,805.83 (*Ministero della Cultura*, 2022b). Of the southern Italian projects, seven projects are in Sicily, three of which are in this dissertation's case study city of Palermo (Table 14).

Table 14 - Winning Project Proposals from the Case Study City of Palermo (Italy)

Proposal no.	Implementing party	Park Denomination	Amount (€)	Score
1	Villa Tasca SRL	Parco Storico Villa Tasca	2,000,000.00	86
2	Università degli Studi di Palermo	Giardino Storico dell'Orto Botanico di Palermo	1,978,268.00	86
4	Municipality of Palermo	Giardino "P. Mattarella", formerly "Giardino Inglese" and the "Garibaldi Parterre"	2,000,000.00	81

All three winners are regularly open to the public; the first as a private park open through an admission fee, the second as a botanic garden which also charges an admission fee and the last is public park which is freely open. As this dissertation is being written, no further advances have been made. However, work on the projects is expected to begin in 2023, and at least 40 projects are anticipated to be completed by 2024. This is also the deadline for the last component of the measure regarding the training of at least 1,260 specialized personnel as master gardeners and advancing historic park and garden cataloguing in heritage registers for a cost of about €10 million (*Ministero della Cultura*, 2022d).

5.4.6 Conclusions

The NRRP investment program for historic parks and gardens is a response to the need to preserve and maintain Italy's 5,000 protected villas, parks and gardens, which are in a critical

state of deterioration. The plan provides resources to regenerate these places and train local personnel to care for and preserve them in the future. It marks an important turn in policy, demonstrating renewed political interest in historic parks and gardens with a 21st century emphasis on sustainability. Like past conservation policy, protection, restoration and management are still the main actions promoted by the measure. However, the NRRP investment program shows that there has been a shift in priority. Instead of protection being seen as superior to fruition (as in the Florence Charter), the positions are reversed with various conservation actions carried out primarily to increase public access and use.

It remains to be seen if the investment program will be successful, however its focus on sustainability and the social benefits of historic parks and gardens marks an important turn in policy, with important implications for the future of historic gardens. Management favoring fruition over conservation will change the physical fabric of the gardens themselves over the long run with both positive and negative consequences. Positive consequences might include the survival of more historic gardens, which will be kept alive as places of local identity through community use and financially through visitor spending. Negative consequences might include the banalization of historic gardens with decision-makers consciously or unconsciously prioritizing visitor services (event programming, restaurants and shops) over conservation (i.e., maintaining historic materials, plantings, and practices and high levels of plant biodiversity).

Section 5.4 References

Canestrini, F., Capuano, A., Galletti, G., Guarino, C., Pizzoni, F., Rallo, G., Rallo Coordinamento, G., Cazzato, V., Colleoni, A., Damiani, G., Fiorentino, G., Marziano, M., Paglialunga, L., & Riccio, E. (2021). Linee guida e norme tecniche per il restauro dei giardini storici. https://media.beniculturali.it/mibac/files/boards/be78e33bc8ca0c99bff70aa174035096/PDF/2022/LINEE%20GUIDA%20E%20NORME%20TECNICHE%20PER%20IL%20RESTAURO%20DEI%20GIARDINI%20STORICI.pdf

Commission Notice *C/2021/1054*, (2021). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021XC0218(01)

Decreto-Legge 6 maggio, no. 59 (2021). Misure urgenti relative al Fondo complementare al Piano nazionale di ripresa e resilienza e altre misure urgenti per gli investimenti. *Gazzetta Ufficiale della Repubblica Italiana*, no. 108 07/05/2021. https://www.normattiva.it/eli/id/2021/05/07/21G00070/CONSOLIDATED/20210730

European Commission (2021, June 22). *Commission endorses Italy's €191.5 billion plan*. Press Release. https://ec.europa.eu/commission/presscorner/detail/en/ip_21_3126

European Commission (2022a). *A European Green Deal*. https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

European Commission (2022c). *Italy's recovery and resilience plan*. https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility/italys-recovery-and-resilience-plan_en

European Commission (2022d). *Recovery and Resilience Facility*. https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en

European Commission (2022d). *Recovery Plan for Europe*. https://ec.europa.eu/info/strategy/recovery-plan-europe_en

European Commission (2022f, March 26). *The European Semester*. https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester_en

Funsten, C., Borsellino, V., & Schimmenti, E. (2021). The appropriate legal and administrative measures: The Florence Charters and legislation governing the identification, listing and protection of historic gardens in Palermo, Sicily. *Restauro Archeologico*, *Special issue 2021*(2), 152–157. https://issuu.com/dida-unifi/docs/ra_special_issue_giardini_storici_2_2021

Governo Italiano (2021). Italia Domani, Piano Nazionale de Ripresa e Resilienza (PNRR). https://www.governo.it/sites/governo.it/files/PNRR.pdf

Italia Domani. (2022a). *NRRP Investments*. https://italiadomani.gov.it/en/Interventi/investimenti.html

Italia Domani. (2022b). *Site identity enhancement programmes: historic parks and gardens*. https://italiadomani.gov.it/en/Interventi/investimenti/programmi-per-valorizzare-l-identita-di-luoghi-parchi-e-giardini-storici.html

Ministero della Cultura (2021). Avviso pubblico per la presentazione di proposte di intervento per il restauro e la valorizzazione di parchi e giardini storici. https://media.beniculturali.it/mibac/files/boards/388a5474724a15af0ace7a40ab3301de/SG/PNRR%20Intervento%202.3%20-%20Avviso_Parchi-Giardini+Allegato-signed-signed.pdf

Ministero della Cultura (2022a, June 21). Approvazione della graduatoria di merito complessiva delle proposte ammesse a valutazione di parchi e giardini - Ministero della cultura.(Decreto SG no. 504 21/06/2022). https://cultura.gov.it/comunicato/decreto-sg-n-504-21062022-approvazione-della-graduatoria-di-merito-complessiva-delle-proposte-ammesse-a-valutazione-di-parchi-e-giardini#contenuto

Ministero della Cultura (2022b, June 21). Assegnazione delle risorse a valere sul PNRR, Missione 1 – Digitalizzazione, innovazione, competitività e cultura, Component 3 – Cultura 4.0 (M1C3), Misura 2 "Rigenerazione di piccoli siti culturali, patrimonio culturale, religioso e rurale", Investimento 2.3: "Programmi per valorizzare l'identità dei luoghi: parchi e giardini storici" del PNRR finanziato dall'Unione europea – NextGenerationEU,. Decreto del Segretario GeneraleDecreto SG no. 505 21/06/2022 2022. https://media.beniculturali.it/mibac/files/boards/be78e33bc8ca0c99bff70aa174035096/Bottoni/Recovery/PDF/inv2.3/DD/M1C3-14_Decreto505_21.06.22_assegnazione_parchi-signed.pdf

Ministero della Cultura (2022c, July 8). Assegnazione delle risorse alle Regioni: attività di formazione professionale per "Giardinieri d'Arte" - Decreto SG 589 08/07/22 - PNRR M1C3, Investimento 2.3. Decreto del Segretario Generale no. 589 del 08/07/22. https://pnrr.cultura.gov.it/assegnazione-delle-risorse-alle-regioni-attivita-di-formazione-professionale-per-giardinieri-darte-decreto-sg-589-08-07-22-pnrr-m1c3-investimento-2-3/

Ministero della Cultura (2023, January 12). Approvazione graduatoria di merito aggiornata. Decreto SG 21 del 12/01/23 – PNRR M1C3 Investimento 2.3 Parchi e Giardini Storici. https://cultura.gov.it/comunicato/approvazione-graduatoria-di-merito-aggiornata-decreto-sg-21-del-120123-pnrr-m1c3-investimento-23-parchi-e-giardini-storici

Regulation EU 2020/852, art. 17, (2020). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32020R0852#d1e2492-13-1

Towse, R. (2002). The Cultural Economy of Heritage. In I. Rizzo & R. Towse (Eds.), *The Economics of Heritage, A Study in the Political Economy of Culture in Sicily* (pp. 3–19). Edward Elgar.

5.5 "An Infinity of Lists"[6]: A Spatial Analysis of the International, National, Regional, and Municipal Registers of Protected Historic Gardens in Force in Palermo, Sicily

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Working paper

[6] From the book by Umberto Eco, published in English with this title and in Italian as *La Vertigine della Lista*.

5.5.1 Introduction

Historic gardens are architectural and horticultural compositions of public interest that are primarily made up of living plants (ICOMOS-IFLA, 1982). Since they were purposefully constructed by people, they are identified and protected as forms of built cultural heritage. However, their significant biotic components give them many of the same qualities of natural heritage. Furthermore, historic gardens often also serve a social purpose as green and recreational infrastructure in urban centers. Traditionally there has been little dialogue between the arenas of built heritage, natural heritage and green infrastructure, despite some recent advances by policy seeking to promote a conceptual unification of biological and cultural diversity into biocultural diversity (Coombes & Viles, 2021; UNESCO-SCBD Programme, n.d.). Nonetheless, historic gardens are mostly governed by built heritage policy instruments that have been developed without their natural and social aspects in mind.

The heritage list is one such important instrument. A heritage list is a catalogue of heritage properties that are designated to be of significant cultural or historical importance; these might include artefacts, artworks, musical or scientific instruments, buildings, monuments, archeological sites, landscapes, natural features, or monumental trees. Listing and cataloguing heritage assets constitutes the main ways heritage is protected, assessed and managed throughout the world (Alonso-Jiménez et al., 2021). Furthermore, publicly accessible heritage lists can help increase people's knowledge and appreciation of these places, which is essential for their protection and preservation (Myers, 2016). In fact, heritage lists have been fundamental components of heritage policy since their international consolidation during the early 20th century (Myers, 2016). More specifically, listing is a protective action prescribed by much of historic garden policy, from the Florence Charter (ICOMOS-IFLA, 1982) to the recent measure in Italy's National Recovery and Resilience Plan for historic parks and gardens (*Ministero della Cultura*, 2022c). However, while these policy documents emphasize the importance of listing heritage, they do not address two important practical issues that limit their feasibility. These issues are relevant for all heritage lists, and perhaps even more critical for historic garden lists.

The first issue regards the time and resources necessary to catalogue heritage. Listing is time intensive and must be carried out by individuals with a high level of education. Historic park and garden lists are even more difficult because cataloguers must have a background in both cultural and natural heritage, including expert knowledge of architecture, horticultural science, history and botany. It may be hard to find cataloguers with such wide-ranging expertise. In any case, the bibliographic, archival and onsite visits necessary to fill out a catalogue entry entails a significant amount of time from a limited number of qualified workers.

The second practical issue regarding heritage lists is their future obsolescence. For heritage lists to be effective, they must be constantly updated to reflect both continuous change in the heritage assets themselves but also continuous change in how society identifies and values heritage (Myers, 2016). One key area where heritage thought has evolved dramatically regards a growing emphasis on the sustainable development outcomes of heritage management. Within the European context, the 1999 Amsterdam Treaty formally recognized environmental protection as a matter of common interest and prioritized the integration of environmental considerations into all other European Union policy areas (Jordan & Lenschow, 2000; Kerschner & Wagner, 2015). This sustainable development focus values both tangible and intangible heritage aspects and emphasizes integrated conservation management planning and participatory practices (Lusiani et al., 2013). It is a key element of such 21st century policy as the United Nation's 2030 Agenda for Sustainable Development with the Sustainable Development Goal 11.4, "strengthen efforts to protect and safeguard the world's cultural and natural heritage" (United Nations, 2015a).

This turn towards sustainable development has important implications specifically for historic gardens and directly connects their cultural and natural heritage aspects to their role as green and or recreational infrastructure. A greater focus on the green infrastructure aspect of historic gardens, and specifically on their contributions to public health and wellbeing, has also been driven by the recent COVID-19 pandemic, as well as by growing concern over climate change and urbanization (Davies & Sanesi, 2021; Hodor et al., 2021; Ugolini et al., 2020). However, these changes have not been incorporated into heritage listing nor to the protection practices that they help enforce. Indeed, both listing forms and practices would have to change significantly to take sustainability into account.

One tool aiming to help policy makers integrate environmental and sustainability issues into decision making is the ecosystem service framework. Ecosystem services describe the benefits that people receive from nature in a quantifiable way with the aim of positively influencing the governance and management of natural capital. Since the Millennium Ecosystem Assessment mainstreamed the framework in 2005, it has been further refined (Potschin & Haines-Young, 2016), with the current CICES framework including supporting services and three sections of final services: provisioning services; regulation and maintenance services; cultural services. While, to the authors' knowledge, there are no ecosystem service assessments of heritage lists, a wide array of ecosystem service tools have been used to map the distribution and quantify the value of urban green spaces (Basnou et al., 2015; Kristiánová & Štěpánková, 2015; Lourdes et al., 2022; Neonato et al., 2018; Pinto et al., 2022; Valente et al., 2020).

5.5.1.2 Research Objectives, Structure and Outcomes

In light of the importance and vulnerability of historic parks and gardens, this study's objective is to critically examine the policy determining historic park and garden governance by looking at how historic park and garden policy is actually applied in a real city, namely the city of Palermo (Italy). Like many historic urban centers, Palermo contains a wealth of historic gardens that constitute much of its publicly accessible green space. However, many of these parks and gardens are extremely degraded (Pirajno et al., 2015) and/or not accessible to visitors.

Thus, while the policies in force are meant to ensure the protection of historic parks and gardens and to promote their public access, their real impact may be quite different. This situation is not exclusive to Palermo but is particularly clear there in its extremity. Thus, the case study's findings are relevant and applicable in a wider international context.

The investigation specifically aims to evaluate heritage lists as policy instruments, asking the questions: 1) do heritage lists adequately identify and protect historic parks and gardens; 2) do historic garden lists provide recreational opportunities, and if so for whom? Using the Recreational Ecosystem Service concept, it aims to provide supply, service, demand and influence indicators whose analysis can help make the practice of list-making more efficient in terms of the sustainable development objectives featured in such 21st century policy as the United Nation's 2030 Agenda for Sustainable Development with the Sustainable Development Goal 11.4 (United Nations, 2015a) and within Italy's National Recovery and Resilience Plan (NRRP).

The investigation is carried out in two steps: first, the main political entities in charge of governing historic gardens are identified for each level of government and each authority's official list is critically analyzed; secondly, each list is mapped into a standardized Geographical Information System (GIS) database, and assessments of each list's supply, service, demand and influence indicators are made based on spatial and administrative parameters derived from the data provided by the lists themselves, by the Italian Census and using the Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST) software suite.

This evaluation has immediate implications for the conservation of Italy's historic park and garden patrimony as well as for historic park and garden conservation in general. Historic parks and gardens are complex systems that have a huge impact on wellbeing, but they are often underestimated by public administrations and fall through the cracks of policy protecting natural and cultural heritage. It is thus imperative to examine the real-world implications of policy measures to rectify this situation and to better design and support future policy to be more effective going forward. Listings are one of the most widespread policy instruments used to assess and manage heritage. Furthermore, due to their clear boundaries and availability of visitor information, historic parks and gardens can also serve as smaller scale laboratories where the complex problems of heritage governance, and specifically heritage listing, can be explored.

5.5.2 State of the Literature

There are few evaluations of the social value of listing heritage. To the authors' knowledge, existing studies value the lists perceived value to the public (Pappalardo et al., 2020), but so far none relate heritage lists to ecosystem services or look specifically at historic park and garden heritage lists. Monumental trees, which are often important components of historic parks and gardens, have received some attention. For example, Asciuto et al. (2015) investigated the existence value of monumental trees within the Madonie Regional Park, finding that monumental trees are quite important to local residents but that they are only willing to pay moderate amounts for their conservation.

Much more has been done in evaluating spatial planning policy. While, to the authors' knowledge, no spatial policy analyses have focused specifically on historic gardens, several spatial analyses studies have sought to support urban greening policy by quantifying the contributions of urban green spaces to human well-being as well as the equity and efficiency of their distribution (Basnou et al., 2015; Remme et al., 2021). For example, Claessens et al. (2014) compare target numbers in Dutch policy documents regarding unsealed soil, soil-water storage and green space per residence to the actual availability and access to green space in the case study town of Hilversum. Specifically, the average area of green space within 500 m^2 of each residence per city district is correlated with each district's population of children (under 15), elderly people (over 64) and average monthly income. They found that the actual percentage of unsealed soil did not meet national policy targets, and was not equitably distributed, thereby shedding light on current urban greening policy's lack of synergy between sectorial areas, such as stormwater regulation, health or cooling benefits. The authors suggest mapping performance regarding existing policy guidelines so that policy documents from different sectors can use the same assessments, and thus more easily interconnect. These suggestions are in line the World Health Organization's (WHO) recommendations that green space projects be considered social and public health investments and that policy-makers and practitioners use local data to guide equitable planning (WHO Regional Office for Europe, 2017a), and that interventions are most effective when they are multidisciplinary and cross-sectoral collaborations that couple a social engagement/participation element with a physical intervention i.e., the "dual approach" (WHO Regional Office for Europe, 2017b).

During the last decade, many scholars and policymakers have used the Ecosystem Service model mainstreamed by the Millennium Ecosystem Assessment (MA, 2005) to analyze and support policy regarding nature's contribution to human well-being in urban environments (Valente et al., 2020). One of the main advantages of an ecosystem service approach is that it allows these contributions to be understood in the synergistic and cross-sectorial way recommended above. Current ecosystem service models are also useful because they

differentiate the various steps in an ecosystem cascade: the supply or potential service of an ecological function; the value of the potential benefits individuals may derive from that service; the actual benefits enjoyed when demand for the service exists and is met (Hamel et al., 2021; Potschin & Haines-Young, 2016; Remme et al., 2021). Mapping ecosystem services provides useful information about the amount, location and beneficiaries provided by urban greening investments, which can be used by local governments, non-governmental agencies and members of civil society who are often in key positions to address urban welfare and resilience through urban infrastructure initiatives but must work within limited budgets (Hamel et al., 2021). Mapping ecosystem services can also contribute to increasing stakeholder involvement and assuring procedural justice (Hamel et al., 2021).

Several tools have been proposed to aid decision-makers in assessing and modeling ecosystem service benefits. Spatial analysis with GIS is a common decision support tool in areas regarding human-environment-society relationships (Nyerges & Jankowski, 2010). GIS brings together multiple sets of information, using location as a linking mechanism, thus allowing that information to be visualized, modelled and analyzed in a spatially explicit way (Wise & Craglia, 2007). Through GIS, spatial policy analysis can estimate the benefits that are provided by enacting a given policy as well as map the distribution of those benefits. This can clarify whether the policy in question is efficient in producing the intended effects and equitable in reaching all intended beneficiaries.

One commonly used GIS decision-support tool to help evaluate the impact of investments in natural infrastructure is the InVEST software suite: a free, open-source modular toolset made available by the Natural Capital project to produce spatially explicit ecosystem service models returning both biophysical and economic results. These results are based on production functions that estimate how changes might affect the flows of ecosystem service benefits to people, and thus account for supply, service and value, connecting ecological function to ecosystem service demand to benefits provided to people in a supply chain. InVEST was produced with the aim of facilitating the incorporation of nature's values into decision making (Sharp et al., 2020). It has been used in over 168 countries (Natural Capital Project, 2021) and in 979 scientific publications (Mandle & Natural Capital Project, 2019). Recently Hamel et al. (2021) have introduced a set of InVEST tools that are specifically adapted to the urban environment, addressing such issues as urban cooling to reduce the urban heat island effect, stormwater management, and access to green recreational spaces in cities. They describe three case studies with the kind of policy analyses recommended by Claessens et al. (2014) with the aims of reducing barriers to incorporating ecosystem service benefit evaluation into planning by facilitating policy and urban design decision-making, exploring possible scenarios, and as a communication and outreach tool for stakeholder involvement (Hamel et al., 2021). The authors note that a deliberate decision was made to make InVEST models as accessible as possible by basing them on open data and basic GIS computer skills. This is meant to help bridge the science-practice gap but limits the results. However, this can be resolved by complementing InVEST with finer grain, tailor made or more advanced analyses.

5.5.3 Materials and Methods

5.5.3.1 Study Context

This study focuses its analysis of historic park and garden heritage listing policy in the city of Palermo, the regional capital of Sicily (Italy). Sicily is part of Italy's *Mezzogiorno*, the southern part of Italy containing the regions of Abruzzo, Apulia, Basilicata, Calabria, Campania, Molise and the major islands of Sardinia and Sicily. According to Valente et al.'s (2020) correspondence analysis between types of urban green infrastructure and urban well-being

indicators in the 116 Italian provincial capitals, the green infrastructure of southern Italian cities is primarily made up of historic parks and gardens. Compared to other Italian regions, these correspond with high levels of health and security, but low levels of social cohesion and inclusion. In fact, the 2015 European Urban Audit found that Palermo residents are among the least satisfied Europeans with their city's livability, with the city tied for third from last in an evaluation of 79 European metropolitan centers (European Union, 2013). Furthermore, in the same survey, 68% of Palermo residents expressed dissatisfaction with their parks and gardens with the situation going downhill; there was a decrease of 31% and drop in ranking of nine places compared to 2012. The 2015 audit also found that satisfaction with green spaces influences overall satisfaction with living in a city, with a correlation coefficient of 0.72.

The municipality of Palermo is found on the northern coast of the Sicily and covers a total area of about 160.59 km^2 (ISTAT, 2017). At the time of the last complete census in 2011 (ISTAT, 2017), the total population was 657,510[7]. Unless otherwise specified, this study will refer to this 2011 data, as the ongoing census reports made by Italy's national statistics institute are provisional, not spatially indexed and only report statistics for the city but not for smaller census sections. Since the elaborations made in this investigation depend on these smaller spatial units, the 2011 population count is used here for consistency.

5.5.3.2 Historic Garden Definitions and Lists Active in the City of Palermo

The first hurtle in listing historic parks and gardens is arriving at a clear definition of exactly what they are. The most cited definition of historic gardens in the literature is that of the Florence Charter (Funsten et al., 2020). Written by the International Committee for Historic Gardens in 1981 and ratified by the International Council of Monuments and Sites (ICOMOS) and the International Federation of Landscape Architects (IFLA) the following year, it was the first international policy document to concern itself specifically with historic gardens. Intended as an addendum to the 1964 ICOMOS Venice Charter for the Conservation and Restoration of Monuments and Sites, it paved the way for other landscape policy measures such as the European Landscape Convention in considering living landscapes as cultural heritage (Goetcheus & Mitchell, 2014). The Florence Charter defines the historic garden as "an architectural and horticultural composition of interest to the public from a historical or artistic point of view" (art. 1), "whose constituents are primarily vegetal and therefore living" (art. 2), (ICOMOS-IFLA, 1982). In 2017, the ICOMOS-IFLA International Scientific Committee on Cultural Landscapes also added a second doctrinal text specifically treating Historic Urban Public Parks to its cannon (ICOMOS-IFLA, 2017), which defines them according to characteristics of "openness and accessibility", "public visitation and enjoyment", "common wealth", and ownership and care by "one or more public bodies or public foundations". The document emphasizes that the concept is not limited or defined by size, may also include spaces described by "words such as garden, square or similar expressions" as long as they are composed of and dependent on "such elements as vegetation, architectural elements, water features, paths, or topography", but emphasizes that the definition does not pertain to "historic promenades, boulevards, avenues, and tree-lined streets" (ICOMOS-IFLA, 2017).

While these doctrinal texts offer an influential expert definition of what constitutes a historic park or garden, they are non-binding. Although there are no known laws exclusively addressing the protection of historic parks and gardens specifically, they are commonly protected as built heritage or designed landscapes by laws addressing the broader categories of cultural and landscape heritage (Ferrucci, 2012). As a result, they may or not be an explicitly identified

[7] As of January 1st, 2021, it was 635,439 (ISTAT, 2022).

subcategory in heritage lists. However, because of their widespread recognition, the above-mentioned ICOMOS definitions for historic parks and gardens are used in this study to clarify the application of more general laws to historic parks and gardens when necessary. The lists and definitions come from various entities located at international, national, regional and local levels of governance (with a preliminary assessment made in Funsten et al., 2021) and thus have some legal weight.

The evaluated lists are: the United Nations Educational, Scientific and Cultural Organization (UNESCO)'s World Heritage List (UNESCO, 2022); the Italian Ministry of Culture's General Heritage Catalogue (*Ministero della Cultura* & ICCD, 2022a); The Italian Ministry of Food Sovereignty and Forests' List of Monumental Trees of Italy (Masaf, 2022a); The Sicilian Region's Heritage Catalogue (CRicd, 2022); the Municipality of Palermo's General Regulatory Plan (*Città di Palermo Settore Urbanistica*, 2004c); the Municipality of Palermo's Detailed Executive Plan of the Historic Center (*Assessorato del Territorio e dell'Ambiente*, 1993)[8]. Each list is evaluated in terms of its listed historic gardens, or listed monumental trees, within the administrative borders of the municipality of Palermo. Although not historic parks or gardens per se, monumental trees are considered in this study because of an assumed strong association and dependence on the former's continued existence. Unless otherwise noted, monumental trees are also inferred when using the terms historic parks and gardens to describe the various steps of this study.

Although representing public institutions, these lists and definitions are created by people, i.e., individual regulators and bureaucrats, and thus are subject to human error and bias. Furthermore, as mentioned in the introduction, listing individual sites has a high transaction cost; it requires authorities with special qualifications (commonly in archeology, art history or architecture) and may incite litigation when owners are not willing to sustain the added burdens listing entails (Towse, 2019). Even a simple rule-based listing (*ope legis*) requires accurate and easily consultable property and land use information to carry out and resources to enforce. According to a public choice theory approach, regulators and bureaucrats are economic agents who will seek to minimize their transaction costs and increase their gains through their list selections (Mazza, 2002; Towse, 2019). Thus, historic park and garden lists will inevitably show bias and distortions connected to these phenomena.

5.5.3.3 Transforming Lists to Spatial Data Sets

Since the various data sources used in this study are at different scales, coordinate systems and quality level, all spatial data was standardized by adapting it to the Italian national 2022 cadastral plan, available as an online web map service (*Agenzia delle Entrate*, 2022). Furthermore, all maps were converted to Italy's most recent official Italian reference datum, RDN 2008, for the Universal Transverse Mercator (UTM) zone 33 North (EPSG 7792), as recommended by the Sicilian regional government (*Regione Siciliana*, 2020). Data received as a shapefile (Monumental trees of Italy), was exported to the new projection system. Data received as a nonlocalized raster file (Palermo's General Plan and Historic Center Plan) was georeferenced with linear transformation and nearest neighbor resampling, using building corners present in both the original map and cadastral map as references. The vertices of property polygons were then aligned with visibly corresponding cadastral parcel limits. Should shapes not correspond, a best guess was made with the aid of Google Satellite and Open Street Map web map service underlays that favored the shape of the original document. Data received

[8] The names and contents of Italian heritage lists, laws and governing bodies have been translated from Italian into English in the text by the authors for readability. However, they are cited and referenced in the original Italian.

as a text file containing cadastral parcel references were drawn over the national cadastral plan, using the property plans in listings as references when parcel numbers had changed. Original data was also inconsistent regarding the inclusion of buildings in the listed space, so a decision was made to exclude building footprints from all datasets, using the national cadastral plan as a reference.

2011 census data was downloaded from the Italian National Institute for Statistics (ISTAT) as shapefiles in the Universal Transverse Mercator (UTM) zone 33 North coordinate reference system for the census sections as a .csv spreadsheet file for census variables (ISTAT, 2017).

All the supply, service, demand and influence indicators used as parameters to evaluate the lists were found using the polygons of sites defined in the manner discussed above with the exception of the monumental trees, where the site was defined as circle with a 10 m radius around the provided point locations.

5.5.3.4 Supply, Service, Demand and Influence Indicators for the Spatial Analysis of Each Historic Garden List

Supply is considered in terms of total historic park or garden area identified by each list and total population served. The latter is calculated by adapting the strategy used by Claessens et al. (2014) thusly: the population from each census area within the 300m walking distance recommended by the WHO (WHO Regional Office for Europe, 2017a), from each site is found by identifying the census sections within a buffer of the same distance and multiplying relevant population data by the percentage of the census section falling within the buffer thusly:

$$PBA_k = PCA_k * \frac{BA_k}{CA_k}$$

where:

PBA_k is the resident population of the area within a 300 m walk of site k;

PCA_k is the total population of the census sections falling entirely or partially within a 300 m walk of site k;

BA_k is the area in m^2 of the same census sections pertaining to site k clipped by a 300 m buffer;

CA_k is the total area of the same census sections pertaining to site k.

Service is considered in terms of the historic park or garden area in m^2 per resident within a 300 m walking distance of each list's historic parks and gardens from the following groups: resident females (F), resident children under 15 (C) and resident elderly people over 64 (E). These three groups are prioritized in accordance with the declared objectives of a measure in the Italian National Recovery and Resilience Plan investment program for historic parks and gardens (*Italia Domani*, 2022b; *Ministero della Cultura*, 2021), and other studies that have highlighted the importance of public green spaces for the elderly (Claessens et al., 2014; Wen et al., 2022).

Demand is considered in terms of the average annual Photo User Days (PUD) located within each list's sites between 2005 and 2017. This constitutes the entire timespan made available by the InVEST Recreation and Tourism model, which uses photos uploaded to the social platform flikr containing location, user-name and date to count PUDs. Each PUD counted within the spatially defined historic park and garden lists is equivalent to one specific photographer who took one or more photographs within a spatially defined listed site on a specific day (Sharp et al., 2020). Historic park and garden demand is measured both in terms of the average annual

PUD within each lists sites and the average annual PUD within a 300m radius from sites. A ratio of PUD/m^2 aims to remove the difference in overall area as a factor to examine list strength regardless of coverage.

Finally, the influence of each list is measured in terms of its effect on the spread of person-days of recreational use calculated with the InVEST Recreation and Tourism model. Average annual rates of visitation are determined for 100 m square grid cells covering the municipality of Palermo using flikr photos taken between 2005 and 2017 and a parametrized regression model is used to estimate the contribution of each heritage list to these patterns of recreational use. A simple linear regression is performed with a log-transformation of the visitation rates as the response variable and predictor variables related to the coverage of each grid cell by heritage list sites:

$$y_i = \alpha + \beta_{Ui}x_{Ui} + \beta_{Ii}x_{Ii} + \beta_{Ti}x_{Ti} + \beta_{Si}x_{Si} + \beta_{Gi}x_{Gi} + \beta_{Di}x_{Di} \text{ for } i = 1\ldots n,$$

where:

y_i is the natural log of average PUDs per cell i + 1;

β_{Ui}, β_{Ii}, β_{Ti}, β_{Si}, β_{Gi}, and β_{Di} are the regression coefficients of each predictor variable (U, I, T, S, G and D respectively) relating the natural log of average PUDs per cell to the coverage of each predictor variable in each cell i.

x_{Ui}, x_{Ii}, x_{Ti}, x_{Si}, x_{Gi}, and x_{Di} are the coverage of each predictor variable (U, I, T, S, G and D respectively) in each cell i.

Table 15 describes each predictor variable and explains how the various heritage lists were defined for spatial calculations.

Table 15 - Predictor Variables for Recreation and Tourism Regression

Variable ID	Description	Spatial calculation
U_i	Polygon of UNESCO listed historic parks and gardens	Polygon area coverage within grid cell i
I_i	Polygon of the Italian General Catalogue historic parks and gardens	Polygon area coverage within grid cell i
T_i	Points representing listed Monumental Trees of Italy	Point count within grid cell i
S_i	Polygon of the Sicilian Regional Heritage Catalogue historic parks and gardens	Polygon area coverage within grid cell i
G_i	Polygon of Palermo's General Regulatory Plan historic parks and gardens	Polygon area coverage within grid cell i
D_i	Polygon of Palermo's Detailed Executive Plan historic parks and gardens	Polygon area coverage within grid cell i

5.5.4 Results

5.5.4.1 Critical Analysis of Historic Park and Garden Lists

What follows is a critical analysis of the historic park and garden lists investigated in this study, discussing their composition, how they define historic parks and gardens (both generally and

operationally for this investigation), how they are implemented in Palermo, and their eventual flaws or inconsistencies.

International Definitions and Lists: UNESCO's World Heritage List

The most well-known and influential international heritage list is the United Nations Educational, Scientific and Cultural Organization's (UNESCO) World Heritage List, implemented by the 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage (1972). It defines World Heritage according to criteria set out in its periodically revised Operational Guidelines (UNESCO, 2021). World Heritage "of outstanding universal value" is divided into three categories: cultural heritage; natural heritage; mixed cultural and natural heritage, which includes cultural landscapes. According to the guidelines, historic parks and gardens should be part of the latter, where they exemplify the subcategory of designed cultural landscapes (art. 47 bis, i.), which "embraces garden and parkland landscapes constructed for aesthetic reasons which are often (but not always) associated with religious or other monumental buildings and ensembles" (UNESCO, 2021). However, incongruently, none of the historic parks and gardens on the list are classified as historic landscapes. Instead, they are listed as cultural heritage, which vastly predominates the list, making up 78% of the listed properties. Natural heritage follows, with 19%. The mixed category only includes 3% listed properties (UNESCO, 2022). This contrast indicates how category choice can be influenced by the knowledge and views of the various stakeholders involved in property nomination. This has been partially addressed by the unification of the ten criteria used to evaluate cultural and natural heritage into a single more flexible list in 2005 to accommodate the reality that most heritage properties contain both cultural and natural elements and that a dichotomous view separating culture from nature is both incorrect and not useful. However, the publicly accessible database does not reflect this revision (UNESCO, 2022).

The case-study city of Palermo contains one UNESCO World Heritage Site: "Arab-Norman Palermo, and the Cathedral Churches of Cefalú and Monreale", a serial property inscribed in 2015 (UNESCO, 2022). Excluding the Cathedral Churches of Cefalú and Monreale, which are in other municipalities, Arab-Norman Palermo contains seven different individual properties within the city: the Royal Palace and Palatine Chapel; the Palermo Cathedral; the St. John of the Hermits Church; the St. Cataldo Church; the St. Mary of the Admiral Church; the Zisa Palace; the Admiral's Bridge. All sites in Palermo contain some outdoor space, which varies in size from about 1,066 m^2 to just over 32,106 m^2 and in character from intensely managed ornamental gardens to extensively managed street greenery. In total, about 62,500 m^2 of outdoor space is protected as part of these World Heritage properties within the municipality of Palermo. For the purposes of this analysis, all of it is considered as historic parks and gardens, according to the definition in art. 47 bis, i, cited above.

The Italian Republic's Definition and Lists: the General Heritage Catalogue and the List of Monumental Trees of Italy

Italy, like many nations, has its own General Heritage Catalogue, defined by art. 17 of the Heritage and Landscape Code (*Codice dei Beni Culturali e del Paesaggio*, 2004). The General Catalogue is meant to identify and describe heritage properties of artistic, historic, archeological and ethnoanthropological interest to assure their protection and public fruition. It is overseen by the Central Institute for Cataloguing and Documentation (ICCD, 2022), part of the national Ministry of Culture, but should be produced through collaboration with regional authorities to comprehensively represent Italian Heritage. An examination of the publicly available catalogue listings (*Ministero della Cultura* & ICCD, 2022a), shows that the system

and resources currently available only achieve patchwork coverage of Italy's vast patrimony. Efforts are being made to improve the situation, with a new public platform and data entry framework in place since 2021 (*Ministero della Cultura* & ICCD, 2022b). The General Catalogue subdivides different kinds of heritage using a hierarchical classification: "parks and gardens" are a subcategory of "architectural and landscape heritage", which is part of the "immovable heritage" category.

Currently, there are 551 publicly accessible listings of parks and gardens throughout all of Italy. None of these are in the Sicilian Region. However, Palermo does contain 21 public immovable heritage listings pertaining to 17 different properties (four are sub-listings of one site), all of which are in the "architecture" category (at the same level as the "parks and garden" category). Seven of these contain outdoor spaces, varying in size from 11 m^2 to 6,999 m^2. In total, 10,302 m^2 of outdoor space is listed as Sicilian regional heritage, making up 65% of the total area of heritage properties of 17,790 m^2. Yet again, this shows that a "park or garden" category is unfavored by the public officials choosing what to include in the General Catalogue and how to categorize it. Like the UNESCO listings, all the outdoor space in these seven listings is considered historic parks and gardens for the purposes of this study.

Another national green heritage list extremely relevant to historic garden conservation is the List of Monumental Trees of Italy, which was instituted by art. 7 of law no. 10 of January 14, 2013, "Norme per lo sviluppo degli spazi verdi urbani". Monumental trees are recognized as such based on their noteworthy size, age, naturalistic value, botanic and species rarity, or because they refer to events or collective memories of historic, cultural, or documentary importance or to local traditions. They can be individual trees and groups of trees in either natural or anthropic environments. Most pertinent to historic parks and gardens, trees are also recognized because they are "within architectural sites of historic and cultural importance, including villas, monasteries, churches, botanic gardens and historic private estates" (Masaf, 2017). The list is overseen by the Ministry of Agricultural, Food Sovereignty and Forests, and is now in its fourth update (Masaf, 2022a).

Currently there are 4,006 monumental tree listings throughout all of Italy, with 160 listings in Sicily and 46 in the municipality of Palermo. Of these, all but three are within an urban environment (Masaf, 2022b). 42 are single trees and four are groups of trees. At breast height (1.3 meters), the monumental tree trunks range in circumference from 2 to 36 m^2. If all listings are considered as single trees (the number of specimens in each group is not provided), that totals to an area of 366 m^2. It should be noted that this surface area is obviously much less than the tree crown area (which is also not provided).

The Sicilian Region's Definition and List: Sicilian Regional Heritage Catalogue

The Sicilian Regional Heritage Catalogue is overseen by the Regional Inventory, Cataloguing and Documentation Center, part of the Regional Department of Sicilian Heritage and Identity according to article 2 of Regional Law no. 80 of August 1, 1977. The Center is meant to act as a functional link between the national government offices and the sub-regional superintendent offices, as well as with other national and international bodies interested in the cataloging and documentation of cultural and environmental heritage (CRicd, 2022). However, as observed above, the resources and system in place up until now have only allowed the office to fulfill its responsibility in a piecemeal way. Since 2022, efforts have been made to make the catalogue accessible through a public online platform that currently holds 230,696 movable and immovable heritage listings. These are then subdivided into six categories: archeological properties; archivistic properties; demo-ethno-anthropological properties; natural and naturalistic properties; landscape, architectural and urban properties; historic, artistic and iconographic properties. There are a total of 6,107 listings in the landscape, architectural and

urban properties category, with 32 in the park and garden subcategory. 17 of these park and garden properties are within the municipality of Palermo. They range from 831 m^2 to 68,460 m^2 in size and cover a total of 258,252 m^2 of open space.

The Municipality of Palermo's Definition and Lists: the General Regulatory Plan and the Detailed Executive Plan of the Historic Center of Palermo

At the municipal level, historic parks and gardens are defined and listed by the municipal General Regulatory Plan, within the broader zoning category of "historic green spaces". The municipal General Regulatory Plan analyzes the current state of a city and evaluates its development potential, establishing the location of main communication routes, public spaces and services and areas of public interest; it also establishes zoning areas and establishes their land-use, building density, offset and maximum height. The term "Zone" was introduced in Italy by article 7 of the Urban Planning Law no. 1150 of 1942, followed by Law 767 of August 6th of 1967 which instituted homogenous land-use zones (art. 17), and finally by article 2 of Ministerial decree no. 1444 of April 2nd (1968) which instituted the attribution of homogenous zoning categories in urban planning. Zoning was rendered obligatory in Sicily by the Regional Laws no. 15/91 and no. 9/93. The plan currently in force in Palermo was adopted in 2002 and revised in 2004 (*Città di Palermo Settore Urbanistica*, 2004c).

The plan provides a list of Palermo's historic green spaces, which it defines as: historic public parks and gardens; areas belonging to the property of historic estates, such as tree rows, entry paths, walled kitchen gardens and orchards, and ornamental gardens; sites of historic monuments; significant or residual historic agricultural landscapes (*Città di Palermo Settore Urbanistica*, 2004b). According to the publicly available shapefile of the zoning limits imposed by the General Regulatory Plan (Sarta, 2015), Palermo contains about 9,780,050 m^2 of green space not counting the historic center, of which 64% is listed as historic[9].

The list of historic green areas locates each listing spatially within a plan of the city and defines a zoning district (*VS* for *verde storico*, i.e., historic green area, or the more restrictive A1 and A2 categories for historic monument zoning districts), typological classification (park, public garden, ornamental garden, tree row, walled garden, agricultural land etc.) and the denomination, if known (*Città di Palermo Settore Urbanistica*, 2004a). There are a total of 294 listings, some of which belong to different areas of a single property. For the purposes of this analysis, the original typological classifications were simplified to: park; garden or square; building site; greenery; agricultural land. As per the Florence Charter (ICOMOS-IFLA, 1982) and Italy's Heritage and Landscape Code (*Codice dei Beni Culturali e del Paesaggio*, 2004), only the 128 listings in the first three categories are considered historic parks and gardens[10]. These cover an area of about 4,528,050 m^2, ranging from about 321m^2 to 641,993 m^2 per listing with a mean of 35,375 m^2.

The municipal General Regulatory Plan does not identify historic green spaces within the historic center of Palermo. The entire area, covering about 2,520,375 m^2, is considered an A1 monumental area, and thus any green space within it is considered as having the same class.

[9] This shapefile was not used to spatially represent the municipal General Plan's listings because its property identification numbers do not match those of the signed and legally binding Plan, nor do the polygon shapes match castral property limits. Thus, it was used as an underlay reference to digitize maps in the legally binding plan during the procedure described below. Furthermore, it should be noted that the above-mentioned total green space area includes buildings. Unless otherwise mentioned, all other surface areas in this study come from the spatial data sets elaborated by the authors.

[10] These are more than the 86 identified in section 5.3 because of the different coding procedures used. The former was only based on the words "garden", "park" or "villa" being part of the listed property's name.

However, the development and management of Palermo's historic center is described by another planning instrument, the Detailed Executive Plan of the Historic Center of Palermo, approved in 1993 by the Regional Land and Environment Office (*Assessorato del Territorio e dell'Ambiente*, 1993). This instrument lists green spaces in terms of being existing or planned, and in terms of public or private ownership. Because the instrument is quite dated, many planned developments have now been carried out, making it difficult to know the current state of the historic city center green spaces. Furthermore, it excludes 326,714 m^2 or about 13% of the historic center because some areas are under the jurisdiction of yet other special plans. For these reasons, one of the supporting documents of the Detailed Executive Plan of the Historic Center of Palermo is used in this study as a substitute, an analysis of the historic built environment (*Comune di Palermo & Assessorato all'Urbanistica e Centro Storico*, 1989a). Site information from the legend (*Comune di Palermo & Assessorato all'Urbanistica e Centro Storico*, 1989b) is coded for its 100 listed green spaces according to the same categories used in the General Regulatory Plan with 76 listings counted as historic parks and gardens, covering a total of 129,819 m^2 and ranging from 46 to 22,124 m^2 per site with a mean of 1,708 m^2.

Table 16 summarizes the analyzed historic park and garden lists, identifies when they were issued (indicating how up to date and thus how relevant they are) and how much information each one includes (indicating both their worth to users and the resources that were necessary to produce them).

Table 16 - Relevancy and Richness of the Evaluated Historic Park and Garden Lists

List	Date issued	Information included
UNESCO World Heritage: "Arab-Norman Palermo, and the Cathedral Churches of Cefalú and Monreale" (UNESCO, 2015)	2015	Cultural description Precise geographic location and extent Ownership and management Decision criteria Photographs Management indicators
Italian General Catalogue: Architectural sites with historic parks or gardens (*Ministero della Cultura*, n.d.)	2003-2021	Cultural description Precise geographic location and extent Ownership and management Legal condition Decision criteria Photographs
Monumental Trees of Italy: Trees in Palermo (Masaf, 2022a)	2022	Precise geographic location Botanic description Legal condition Decision criteria
Sicilian Regional Heritage Catalogue: historic park and garden entries in Palermo (Cricd, 2021; CRicd, 2022)	2003-2007	Cultural description Botanic description Precise geographic location and extent Ownership and management Management indicators Photographs

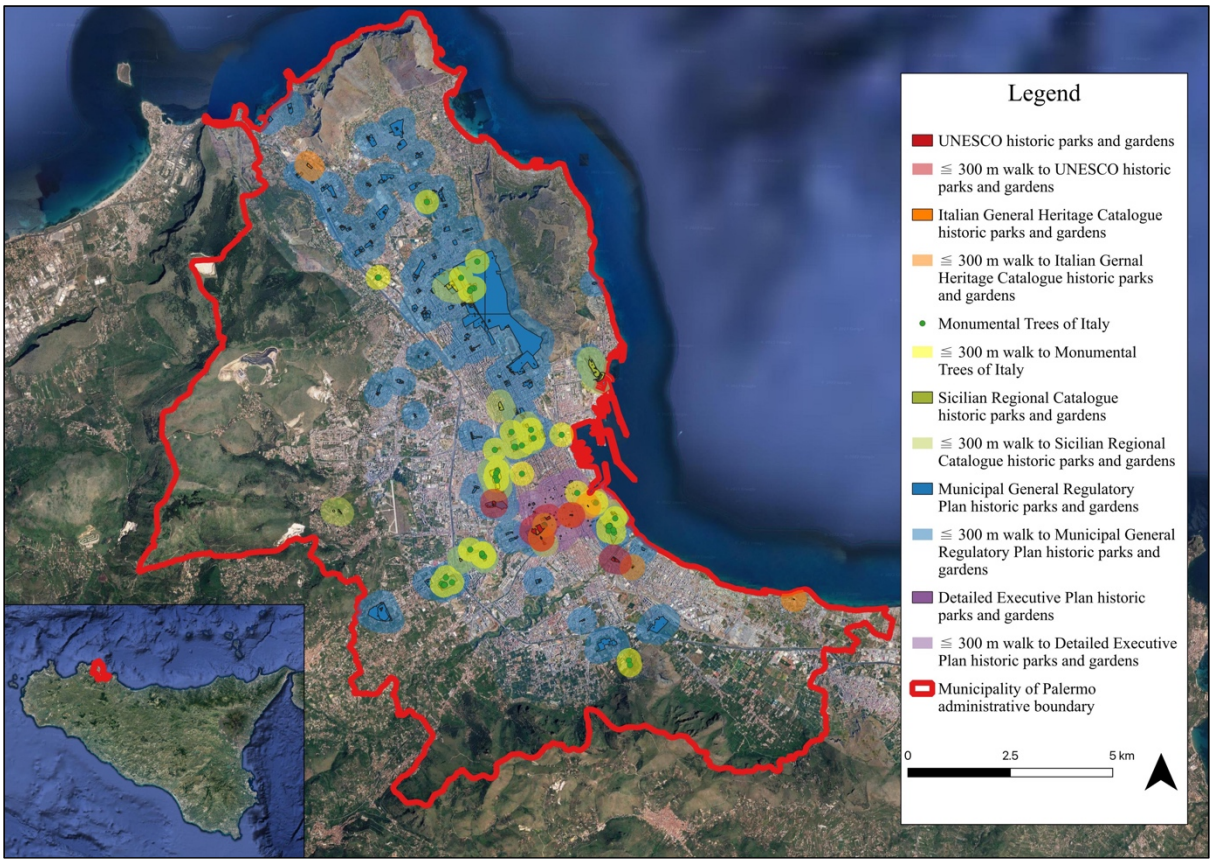
Palermo General Regulatory Plan: historic green areas (*Città di Palermo Settore Urbanistica*, 2004a, 2004c)	2004	Name of site Typology Imprecise geographic location and extent
Detailed Executive Plan of the Historic Center of Palermo (*Comune di Palermo & Assessorato all'Urbanistica e Centro Storico*, 1989a)	1993	Typology Imprecise geographic location and extent

5.5.4.2 Mapping the Lists

If all the historic park and garden listed sites are merged (excluding buildings) so that overlapping areas aren't counted multiple times, they identify 4,726,490 m^2 of historic parks and gardens within Palermo or 7.44 m^2/resident of potential park or garden area.

Mapping these listed historic parks and gardens (Fig 11) shows that they are concentrated in the historic center and along the city's historic axis, the main lines of growth along which the city grew as it expanded from a Punic settlement around 700 B.C.E to the present day. These areas are mostly in the plains, where fertile soil and available water made horticulture advantageous in the past (Pirajno et al., 2015).

Figure 11 - Map of Palermo's Listed Historic Parks and Gardens



5.5.4.3 Historic Park and Garden Supply

A breakdown (Table 17) of the total area, number of sites, population within walking distance and area per resident of the historic parks and gardens identified by heritage lists shows that as lists become more local, their coverage of the city increases, and their catalogue contents can be reached by more residents.

Table 17 - Historic Park and Garden Supply Identified by Heritage Lists

	Area (m^2) (% Palermo's total area[**])	No. listings	PWA[*] (%Palermo's total resident population[†])	m^2/resident
UNESCO World Heritage List	62,500 (<0%)	7	20,800 (3%)	3.00
Italian General Heritage Catalogue	10,302 (<0%)	6	14,999 (2%)	0.69
Monumental Trees of Italy	366 (<0%)	46	55,089 (8%)	0.01
Sicily's Regional Heritage Catalogue	25,8252 (<0%)	17	58,385 (9%)	4.42
General Regulatory Plan	4,528,050 (3%)	128	246,318 (37%)	18.38
Detailed Executive Plan	129,819 (<0%[‡])	76	43,473 (20%)	2.99

[*]PWA is the resident population of the area within a 300 m walk of heritage list's sites.

[**] Palermo covers a total area of 160,150,456 m^2.

[†] Palermo has 635,439 residents.

[‡] The Detailed Executive Plan only regards the historic center, which covers about 2,520,375 m^2 of Palermo. If only this area is considered, the list's historic parks and gardens cover about 5% of the total historic center area.

5.5.4.4 Historic Park and Garden Services for Special Needs Groups

Focusing on special needs groups (Table 18), the same trends seen above seem to also hold true for the general population; the more local the list, the more historic park and garden lists provide access to special needs groups.

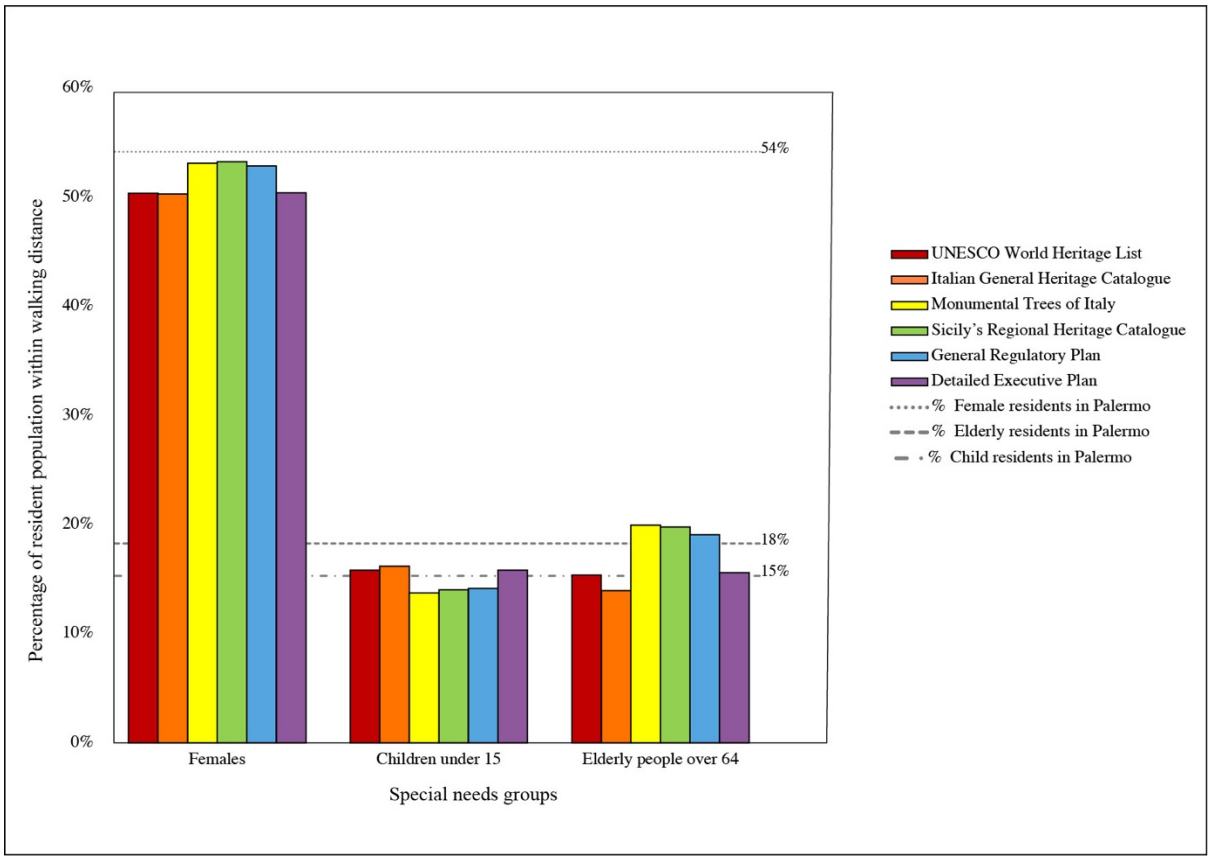
Table 18 - Historic Parks and Gardens Identified by Heritage Lists as Services for Special Needs Groups

	PWA_F* (%of total PWA)	m^2/F	PWA_C (%of total PWA)	m^2/C	PWA_E (%of total PWA)	m^2/E
UNESCO World Heritage List	10,487 (50%)	5.96	3,295 (16%)	18.97	3,201 (15%)	19.53
Italian General Heritage Catalogue	7,548 (50%)	1.36	2,432 (16%)	4.24	2,093 (14%)	4.92
Monumental Trees of Italy	29,287 (53%)	0.01	7,580 (14%)	0.05	11,008 (20%)	0.03
Sicily's Regional Heritage Catalogue	31,124 (53%)	8.30	8,195 (14%)	31.51	11,565 (20%)	22.33
General Regulatory Plan	130,321 (53%)	34.75	34,891 (14%)	129.78	47,070 (19%)	96.20
Detailed Executive Plan	21,931 (50%)	5.92	6,886 (16%)	18.85	6,783 (16%)	19.14

*PWA is the resident population of the area within a 300 m walk of heritage list's sites; PWA_F is the female resident population of the area within a 300 m walk of heritage list's sites and m^2/F is the historic park and garden area identified by each heritage list per resident female; PWA_c is the resident child population (under the age of 15) of the area within a 300 m walk of heritage list's sites and m^2/C is the historic park and garden area identified by each heritage list per resident child; PWA_E is the resident elderly population (over the age of 64) of the area within a 300 m walk of heritage list's sites and m^2/E is the historic park and garden area identified by each heritage list per resident elderly person.

Comparing the percentage of residents within walking distance from listed historic parks and gardens that belong to special needs groups to their overall share in Palermo's resident population (Figure 12) shows that lists whose sites are concentrated near the historic center such as the UNESCO World Heritage List, Italian General Catalogue and Detailed Executive Plan slightly underperform the city's share of women but just outperform the city's share of children. The lists outperform the city's share of elderly people for the more expansive and suburban Monumental Trees of Italy list, Regional Heritage Catalogue and General Regulatory Plan.

Figure 12 - Percentage of Palermo's Resident Population Within Walking Distance from Listed Historic Parks and Gardens Belonging to Special Needs Groups*



* Palermo's 2011 census registered a total of 344,375 female residents, 98,036 children under 15 and 116,966 elderly residents over 64.

5.5.4.5 Historic Park and Garden Demand

An examination of the average annual PUDs (Table 19) for historic garden lists calculated for the period 2005-2017 shows that results are quite spread out. While the share of Palermo's PUDs from the lists is modest (less than 5% for each one), the area within a 300 m walk from each list's sites contains from 18% to 60% of Palermo's share of average annual PUDs.

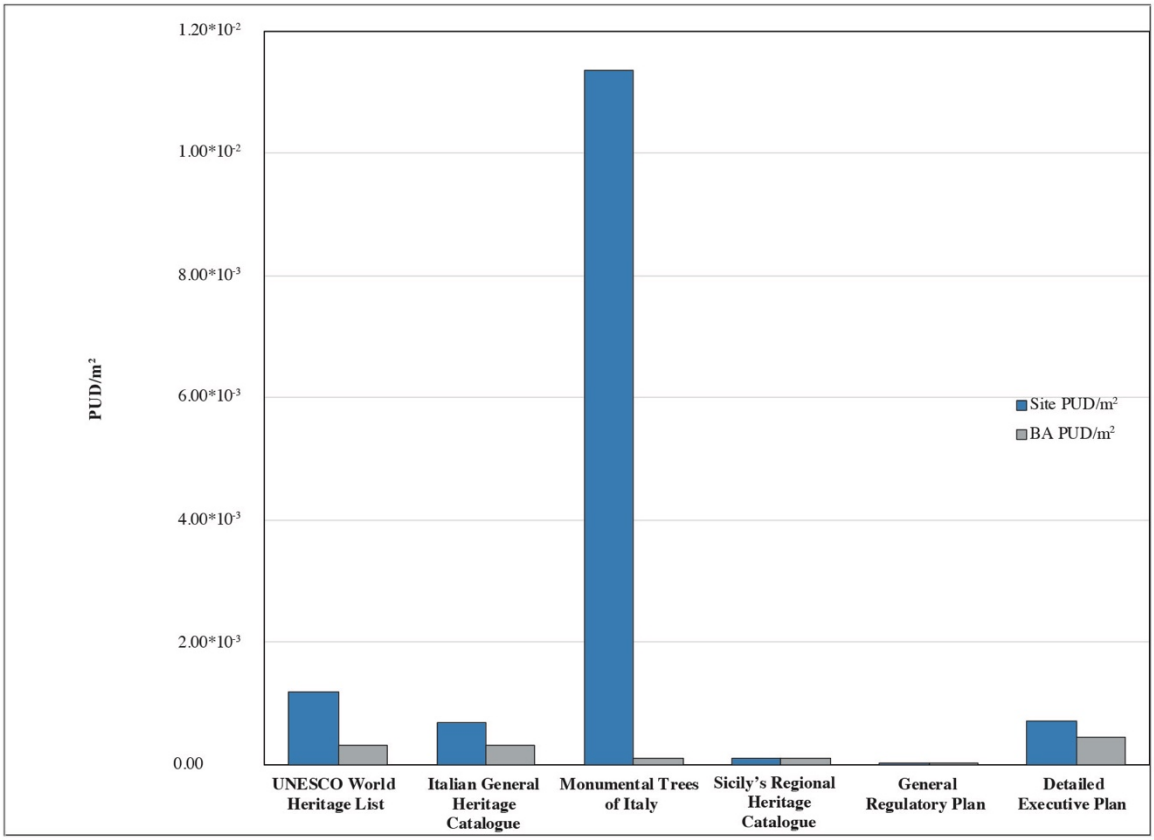
Table 19 - Historic Park and Garden Demand Measured in Average Annual PUDs

	Sites' average annual PUDs (% Palermo's total average annual PUDs*)	Sites' average annual PUDs/m^2	Walking distance area's average annual PUDs (% Palermo's total average annual PUDs)	Walking distance area's average annual PUDs/ m^2
UNESCO World Heritage List	74.38 (2.58%)	$1.19*10^{-3}$	641.00 (22.20%)	$3.19*10^{-4}$
Italian General Heritage Catalogue	7.00 (0.24%)	$6.79*10^{-4}$	583.69 (20.21%)	$3.06*10^{-4}$
Monumental Trees of Italy	4.15 (0.14%)	$1.14*10^{-2}$	732.54 (25.37%)	$1.18*10^{-4}$
Sicily's Regional Heritage Catalogue	24.62 (0.85%)	$9.53*10^{-5}$	533.15 (18.46%)	$9.79*10^{-5}$
General Regulatory Plan	103.23 (3.57%)	$2.28*10^{-05}$	650.46 (22.52%)	$2.02*10^{-5}$
Detailed Executive Plan	92.31 (3.20%)	$7.11*10^{-4}$	1667.92 (57.76%)	4.3910^{-4}

*All of Palermo has an average annual PUD count of 2,887.85 during the reference years of 2005-2015. This translates to $1.80*10^{-05}$ PUDs/m^2.

An examination of the average annual PUDs/m^2 of each list and relative area within 300 m shows which lists have drawn more flikr users regardless of their size and how that compares to their surrounding area within walking distance (Figure 13). Except for Sicily's Regional Heritage Catalogue, all lists draw more flikr users than their surrounding areas.

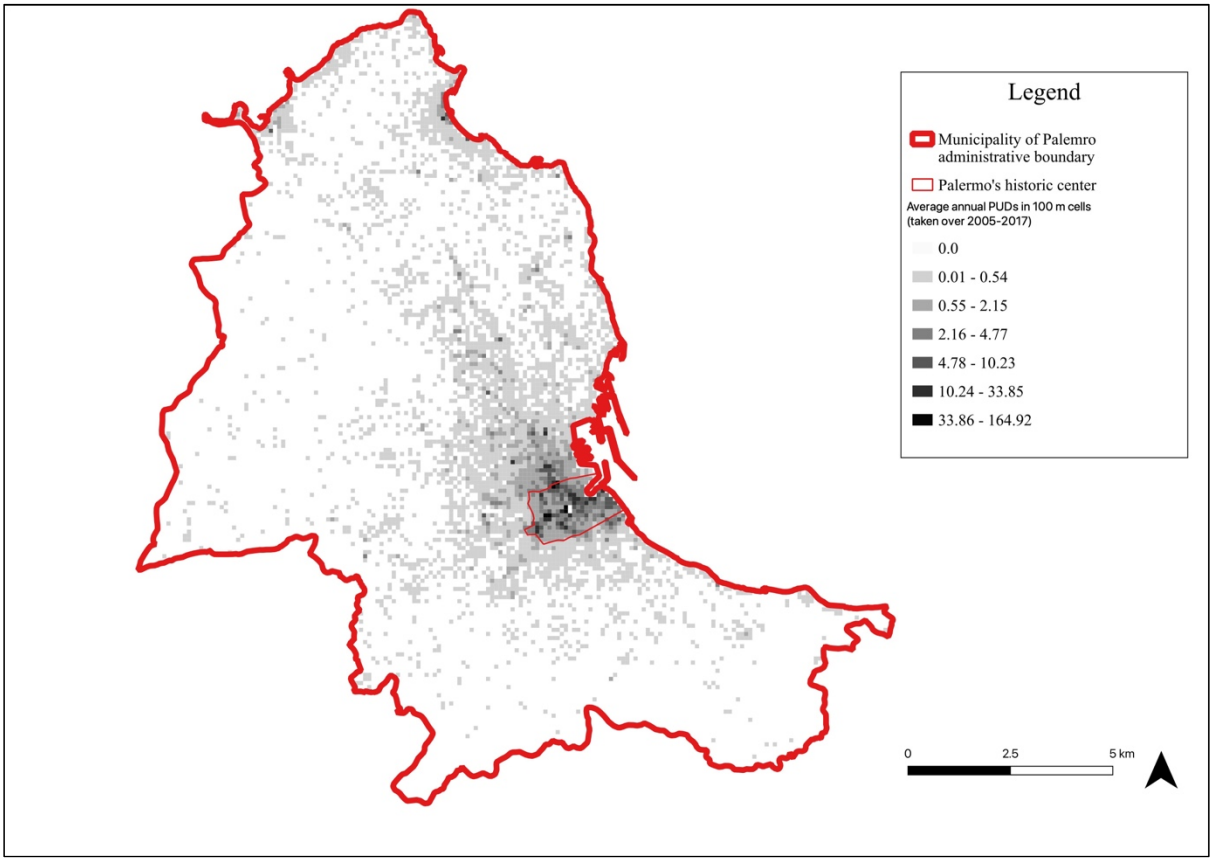
Figure 13 - Average Annual PUD/m^2 of Each List and Relative Area Within a 300 m Walk



The Monumental Trees of Italy list has the highest average annual PUD/m^2 but might be influenced by the different nature of monumental trees in respect to historic parks and gardens. The UNESCO list of historic parks and gardens follows, followed by the Detailed Executive Plan and the Italian General Heritage Catalogue. Sicily's Regional Heritage Catalogue and the General Regulatory Plan come in last, not differentiating themselves much from the average annual PUDs for Palermo as a whole.

A look at the overall average annual PUDs for 100 m grid cells over the entire city of Palermo (Figure 14) shows that the greatest concentrations of PUDs are in Palermo's historic center and along the waterfront, especially in the beach neighborhood of Mondello.

Figure 14 - Average Annual PUDs for 100 m Grid Cells Over the Entire City of Palermo



5.5.4.6 Influence of Historic Park and Garden Lists

Table 20 shows the regression equation calculated with the InVEST Recreation and Tourism model that estimates the influence of each heritage list on patterns of recreational use.

As the parametrized regression model shows, the influence of each heritage list on patterns of recreational use is negligible. Currently, historic garden lists are poor predictors of PUD distribution patterns.

Table 20 - Predictor Variables for Recreation and Tourism Regression

Variable ID	Description	Coefficient estimate	Standard deviation	t-score (p-value)
α	Intercept	$6.866*10^{-2}$	$2.111*10^{-3}$	32.53 (0.00)
β_U	UNESCO listed historic parks and gardens	$2.281*10^{-4}$	$1.899*10^{-5}$	12.02 (0.00)
β_I	Italian General Catalogue historic parks and gardens	$1.399*10^{-4}$	$5.126*10^{-5}$	2.729 (0.01)
β_T	Monumental Trees of Italy	$2.900*10^{-1}$	$3.205*10^{-2}$	9.050 (0.00)
β_S	Sicilian Regional Heritage Catalogue historic parks and gardens	$2.685*10^{-5}$	$7.170*10^{-6}$	3.745 (0.00)
β_G	Palermo's General Regulatory Plan historic parks and gardens	$5.455*10^{-6}$	$1.433*10^{-6}$	3.807 (0.00)
β_D	Palermo's Detailed Executive Plan historic parks and gardens	$3.252*10^{-4}$	$1.316*10^{-5}$	24.71 (0.00)

Residual standard error: 0.2564 on 15,363 degrees of freedom; multiple R-squared: 0.0895; adjusted R-squared: 0.0891; SSres: 1009.6859.

5.5.5 Discussion

This study examines the official historic park and garden lists in force in Palermo, Italy, which range in scale of jurisdiction from international, to national to regional to local.

The first issue to emerge from this analysis regards the different purposes that heritage lists have. While international, national or regional heritage lists identify heritage sites that have significance beyond their local community, local planning lists serve to control development through zoning codes and masterplans and thus include all heritage that has present or may have future significance for the population. Thus, as heritage authorities become more local, their list catalogue is expected to become more comprehensive. On the other hand, non-local authorities are expected to have more selective lists that highlight extraordinary national, international or regional treasures. This fits with the scenario presented in Palermo: as the examined heritage lists become more local in scope, their number of listed sites, area coverage and resident population all increase. However, they also include less information and are increasingly out of date (Table 16).

From an economic standpoint, this phenomenon might be explained in terms of the higher costs involved in providing richer and more precise information, the depreciating value of that information as it becomes obsolete and the social discount rate applied to listed heritage, i.e., the conversion rate to transform future social costs and benefits into current value (Groom et al., 2022). Ideally, these higher costs should be balanced by a slower rate of obsolescence and higher present and future benefits.

While performing a rigorous cost-benefit analysis goes beyond the purposes of this study, its possibility is worth suggesting. A rough estimate of the manpower and extra costs involved in a Sicilian historic garden listing is given here as an example.

The information used to conduct the analyses in this paper shows that each historic park and garden listing in the Sicilian Regional Heritage Catalogue was compiled by an average of six government employees with credentials in architecture or agronomy, and thus all with graduate degrees in these respective fields. 32 listings were elaborated between 2003 and 2007 (Cricd, 2021), thanks to European Union Structural Funds allocated by a project for the regional computerized catalog of cultural property (*Regione Siciliana Assessorato Beni Culturali Ambientali e Pubblica Istruzione*, 2009) costing €114,507,414.00 in its entirety (*Regione Siciliana Assessorato Beni Culturali Ambientali e Pubblica Istruzione*, 2009). Considering that the total catalog contains 230,697 listings of which 32 are historic parks and gardens (CRicd, 2022), an estimated €15,883.00 euro of structural fund money was spent cataloguing Sicilian parks and gardens (almost €500 per listing). It should be noted that this cost does not consider the ordinary operating costs of the interested government offices and employees involved.

A more recent example of historic park and garden listing costs can be taken from Italy's National Recovery and Resilience Program (NNRP), which coincidentally is also funded by the European Union. As part of a larger €300 million investment program to enhance place identity with historic parks and gardens, €10 million are budgeted to train master gardeners and to catalogue historic parks and gardens throughout Italy. €7,818,200.00 (*Ministero della Cultura*, 2022d) of these funds has already been allocated towards the training. Thus, if one assumes that the rest of the funds (€2,181,800.00 euro) will be divided up equally among Italy's twenty regions, one can assume that only about €109 thousand will be spent cataloguing Sicilian historic parks and gardens. No target is set for the number of listings to add or update but based on the estimate of €500 per listing produced above, this amount would allow for about 218 listings. Again, this estimate only regards additional costs and does not include the regular operating costs of the government offices and employees responsible for national and regional heritage cataloguing.

This brief cost-estimate shows that heritage listing has fiscal limits. It is unrealistic to assume that a governing body can comprehensively register all heritage, also because the very concept of what constitutes historical significance is constantly in flux (Lowenthal, 2015). Furthermore, as the cultural economist Ruth Townse suggests, heritage can be prone to inflation (Towse, 2019). As standards relax and more and more sites become listed, heritage denominations lose significance.

Thus, authorities should strategically try to maximize the public utility created through the heritage listing process within their given budget. The UNESCO and Monumental Trees of Italy are the best examples of this in this study. UNESCO takes great care in selecting quality sites with the necessary correlated services to satisfy tourism demands and consequently whose brand carries a high added value due to its prestige and recognizability. The Monumental Trees of Italy, on the other hand, defends its list against obsolescence by revising it annually and minimizes public administration costs by having local qualified individuals and entities catalogue entries. Although less information is included in each listing, that which is provided is precise and ready to use in spreadsheet and shapefile formats.

The Italian national and Sicilian regional catalogues could both be improved in these regards; the depth of information in each listing is not balanced with the accessibility and quality of sites nor with their up-to-datedness. At the local scale, Palermo's General Regulatory and Detailed executive plans are practically comprehensive of historic park and garden sites but incredibly imprecise, poor in information and quite out of date. In fact, both had to be re-elaborated by the authors to make them usable. This task was made much easier and more reliable by advances in technology and in open-access data and policy. This is in part thanks to the Infrastructure for Spatial Information in Europe (INSPIRE) directive (2007/2/CE, received in Italy with decree law 27 January 2010, no. 32).

Indeed, the various analyses performed in this study could easily be used by public officials overseeing list-making to perform a rapid check-up. Assuming that the INSPIRE directive's requirements have already been met[11], these checks can be performed quickly and easily. Eventual inconsistencies or special issues can then be further investigated as needed. This check-up should be performed in a strategic planning context, evaluating lists in terms of clear aims and objectives. In accordance with the recent Italian historic park and garden policy initiative within the National Recovery and Resilience Plan (*Italia Domani*, 2022b; *Ministero della Cultura*, 2021), and recent urban greening guidance issued by the European Environment Agency (European Environmental Agency, 2022), this study assumes that historic park and garden lists aim to increase wellbeing by providing a supply of quality green spaces that are accessible to the public, particularly special groups such as women, children and the elderly, and by promoting sustainable tourism and recreation. Local planning lists contribute to this aim through command-and-control measures related to land use while the purpose of regional, national and international catalogues seems directed more towards promotion. In this regard, it should be noted that being part of the General Italian or Sicilian Regional Heritage Catalogue does not entail any legal protection beyond *ope legis*. This is also true in other countries such as the United Kingdom (Harney, 2014a). Thus, being listed is not equivalent to being protected. To obtain a fully protected status, heritage goods must be verified in person as such by government authorities (*Codice dei Beni Culturali e del Paesaggio*, 2004). This list of fully protected sites is not available to the public in Italy. On the other hand, the Monumental Trees of Italy does entail legal protection for all listed trees as well as legally binding prescriptions regarding their management.

The WHO recommends that city residents have access to 5-10 thousand m^2 of public green space within 300 m of their residence (WHO Regional Office for Europe, 2017a, 2017b), while Italian urban standards require 9 m^2 of parks or gardens be available per resident (Decreto ministeriale no. 1444 02/04/1968). Although it might seem that the 4,726,490 m^2 of historic parks and gardens (7.44 m^2/resident of potential park or garden area) identified by the heritage lists satisfy much of national requirements, it should be noted that many of these sites are not properly cared for and often not open to the public. Thus, they represent a potential resource that could benefit the public if their quality and accessibility improve but do not actually fulfill requirements.

This same issue holds true regarding the ability of historic parks and gardens to serve special needs populations. Should all the listed sites be made available to the public, they would do a good job of providing a valuable service to the women, children and the elderly. Lists concentrated near the city serve a population base with a slightly higher percentage of children while lists that reach out towards peripheral neighborhoods serve a population base with a slightly higher than average percentage of elderly residents. These groups require different accessory services to enjoy parks and gardens and respond to different engagement practices. Following this line of reasoning, parks and gardens in the UNESCO, The Italian General Heritage Catalogue and the Detailed Executive Plan lists might benefit from the participatory involvement of local schools while the Monumental Trees of Italy, Sicily's Regional Heritage Catalogue and Palermo's General Regulatory Plan sites might benefit from the participation of retirees through volunteer organizations.

[11] An INSPIRE guidance document (INSPIRE Thematic Working Group Land Use, n.d.) notes that "zoning plans affect the constructability of cadastral parcels and therefore have well-defined boundaries". Thus, it makes sense to change the documentation system to one that use cadastral parcels as the underlying base map for all heritage lists, including municipal planning documents.

These kinds of engagement practices become even more important considering the low demand measured in flikr PUDs for historic parks and gardens and the low strength of the heritage lists measured in terms of correlation and regression coefficients. On a positive note, there is a higher density of PUDs within list sites compared to their surrounding area, and a great number of recreationists circulating within walking distance of historic parks and gardens that could be drawn in through better promotion and engagement. The Monumental Trees of Italy does the best in terms of sites' PUD/m^2 and regression coefficient, indicating that monumental trees might be important attractors within historic gardens.

The UNESCO World Heritage List, Italian General Catalogue and Detailed Executive Plan do best in terms of sites' average annual PUDs and percentage of Palermo's total average annual PUDs. They come in next to the Monumental Trees list for their regression coefficient.

A look at the overall gridded annual average PUD map for the city clearly shoes a concentration of flikr users in the historic center, suggesting that higher values for lists that are concentrated in the vicinity of the historic center might be benefitting from its inherent draw. This shows how important it is for city historic center authorities to pay more attention to their historic parks and gardens. These spaces, along with their monumental trees, would be an important part of tourist and recreational user experiences if better catalogued, promoted and maintained.

5.5.6 Conclusions

This study has contributed an efficient way to evaluate historic garden lists, and heritage lists in general, using open access data and open-source software to analyze the heritage lists of a case-study city with a wealth of historic gardens but also lacking effective conservation and management instruments. The heritage list is one such instrument, and often the starting point for putting strategies and other instruments into action.

This analysis has shed light on two limits to the feasibility of heritage listing and offered a first approach towards their resolution, with implications both for policy and practice. Firstly, heritage listing is a time and resource intensive activity that must be carried out within a limited budget. This study has shown how publicly available geo-referenced data can help identify gaps in currently existing heritage lists, especially regarding prescribed policy objectives. This kind of evaluation could help heritage policy and list makers strategically plan their efforts to reach objectives while keeping within budget and resource limits. This would entail more thoughtful and precise definitions of heritage list objectives as well as more practical project planning.

The second feasibility issue with heritage regards the obsolescence of existing heritage lists, especially because they have not kept up with the continual evolution of how society identifies and values heritage. Specifically, heritage listing has fallen far behind heritage policy, which has been placing growing emphasis on its role in sustainable development. While the benefits of urban green space are increasingly recognized in academia and in public policy (European Environmental Agency, 2022), the added complexity that a great deal of urban green spaces are protected historic parks and gardens still seems to get lost. The current sustainability-oriented vision of heritage more explicitly connects the cultural and natural heritage aspects of historic gardens to their role as green and or recreational infrastructure.

This study has shown that the ecosystem service framework, along with publicly available ecosystem service valuation tools that use publicly available geo-referenced data, may help resolve both heritage list feasibility issues by making it easier for heritage and planning authorities to connect their efforts with those related to public health as well as to other urban greening, nature-based solution, biodiversity, climate change and sustainability and resiliency initiatives. As Claessens et al. (2014) noted for urban green space policy, better information,

quality and accessibility should make these kinds of cross-sectorial dialogues easier. Advocates of historic parks and can also use the ecosystem service framework and valuation tools to incentivize and aid authorities in making sure that historic garden lists are current and useful, starting with making them publicly available in a way that conforms to international land-use information standards (i.e., INSPIRE). Furthermore, a line of communication and mutual aid should be maintained between institutions working to promote and conserve the same valuable and delicate resources, instead of each one working separately and differently.

This study was limited by the quality of the available list data, which was often dated and compiled according to different standards. However, this same problem also brought to light critical issues in list making, made even more evident because the authors stepped into the shoes of list compilers to make the available data usable. Furthermore, the decision to base the tourism and recreational demand analysis on the publicly available and free InVEST software suite, which in turn relies on data from 2005-2017 from the social media platform flikr, may have also limited the accuracy and relevance of findings. However, other studies have found a relatively good correlation between flikr data and traditional on-site surveys (Sinclair et al., 2020; Wood et al., 2013). Sinclair et al. note that flikr data is a good starting point for evaluating an area's recreational ecosystem services because they have found that social media using nature-based recreationists do not necessarily act differently from general recreationists. However, flikr data does not allow for the collection of such information as number of people in a group, method of travel or visitor satisfaction. Thus, the authors suggest that social-media-based studies could be calibrated with onsite surveys to properly evaluate whether a good correlation exists between social-media visitor days and actual visits. They also suggest using crowdsourced data in preliminary studies to identify where costly and time-consuming on-site surveys would be most rewarding. With this in mind, and in accordance with the designers of InVEST's tourism and recreation model (Hamel et al., 2021), it was felt that proposing an initial accessible evaluation tool was the priority in this research project, especially in a context (Palermo's historic parks and gardens) that is so far behind.

In terms of future directions, this paper could be a jumping off point for performing an ad-hoc analysis of flikr photos that include 2018-present data, such as that carried out by Sinclair et al., (2020). Such a study would be able to better affirm or disprove the apparent lack of draw created by historic park and garden lists (a red flag for the institutions spending money on creating and maintain them) or show recent changes that might have come about during and after the COVID-19 pandemic. Furthermore, the number of PUDs could be converted to a monetary recreational value estimate by using the photo-taker's user profile to elaborate a travel cost analysis.

Another aspect that this study brings up is the importance of animating listed sites though promotion and visitor engagement. It is not enough for a historic garden to be listed, to have real recreational value they must be accessible to the public and they must be animated by public engagement initiatives that draw people inside and provide them with meaningful experiences. Future studies could enrich this current analysis with information on the accessibility, available services, care and public engagement present in historic parks and gardens.

Finally, a frontier in the spatial evaluation of public policy is GIS-based multi-criteria analysis (Lourdes et al., 2022), which would allow for assessments of different aspects of historic parks and gardens, including other ecosystem services along with recreational ones, to be evaluated in a systematic way.

Section 5.5 References

Agenzia delle Entrate (2022). *Cartografia catastale WMS* (Issue 1.3.0). https://wms.cartografia.agenziaentrate.gov.it/inspire/wms/ows01.php

Alonso-Jiménez, R. F., Loren-Méndez, M., Pinzón-Ayala, D., Ollero-Lobato, F., Reinoso-Gordo, F., Gámiz-Gordo, A., José, A., & Pontes, G.-B. (2021). Heritage cataloguing in history: Conceptual and graphical foundations of immovable cultural heritage data bases in the case of Spain. *Sustainability*, 13:19, 11043. https://doi.org/10.3390/SU131911043

Asciuto, A., Borsellino, V., D'Acquisto, M., di Franco, C. P., di Gesaro, M., & Schimmenti, E. (2015). Monumental trees and their existence value: The case study of an Italian natural park. *Journal of Forest Science*, *61*(2), 55–61. https://doi.org/10.17221/86/2014-JFS

Assessorato del Territorio e dell'Ambiente (1993). *Norme di attuazione del Piano Particolareggiato Esecutivo*. Comune di Palermo. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_11062014123739.pdf

Basnou, C., Pino, J., & Terradas, J. (2015). Ecosystem services provided by green infrastructure in the urban environment. *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*, *10*. https://doi.org/10.1079/PAVSNNR201510004

Città di Palermo Settore Urbanistica (2004a). *Elenco Verde Storico adeguati ai d.dir. 558 e 124/DRU/02 di approvazione*. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_09012014121349.pdf

Città di Palermo Settore Urbanistica (2004b). *Norme Tecniche di Attuazione, adeguate alla Errata Corrige*. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_20122013095758.pdf

Città di Palermo Settore Urbanistica (2004c). *Variante Generale al P.R.G., Relazione Generale*. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_14052014162916.pdf

Claessens, J., Schram-Bijkerk, D., Dirven-van Breemen, L., Otte, P., & van Wijnen, H. (2014). The soil-water system as basis for a climate proof and healthy urban environment: Opportunities identified in a Dutch case-study. *Science of the Total Environment*, *485–486*(1), 776–784. https://doi.org/10.1016/J.SCITOTENV.2014.02.120

Codice dei beni culturali e del paesaggio (2004). Decreto legislativo no. 42 and successive modifications, *Gazzetta Ufficiale della Repubblica Italiana* no.45 del 24-02-2004 - Suppl. Ordinario no. 28. https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2004-01-22;42

Comune di Palermo, & Assessorato all'Urbanistica e Centro Storico (1989a). La tipologia edilizia storica. In *Piano Particolareggiato Esecutivo Centro Storico: Tav. 9*. Comune di Palermo. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_12062014110839.pdf

Comune di Palermo, & Assessorato all'Urbanistica e Centro Storico (1989b). La tipologia edilizia storica - legenda. In *Piano Particolareggiato Esecutivo, Tav. 9*. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_12062014110659.pdf

Coombes, M. A., & Viles, H. A. (2021). Integrating nature-based solutions and the conservation of urban built heritage: Challenges, opportunities, and prospects. *Urban Forestry and Urban Greening*, *63*. https://doi.org/10.1016/J.UFUG.2021.127192

Cricd (2021). Schede PG. In *full .html files of historic park and garden listings*. Centro Regionale per l'inventario, la catalogazione e la documentazione dei beni culturali della Regione Siciliana.

CRicd (2022). *Catalogo Beni Culturali della Regione Siciliana*. https://catalogobeni.cricd.it

Davies, C., & Sanesi, G. (2021, September 22). *Special Issue on COVID-19*. Urban Forestry & Urban Greening. https://www.sciencedirect.com/journal/urban-forestry-and-urban-greening/special-issue/1045ZMW7L0V

Decreto ministeriale no. 1444 of April 2nd (1968). *Gazzetta Ufficiale della Repubblica Italiana*. https://www.gazzettaufficiale.it/eli/id/1968/04/16/1288Q004/sg

European Environmental Agency (2022). Who benefits from nature in cities? Social inequalities in access to urban green and blue spaces across Europe. In *Briefing no. 15/2021*. https://doi.org/10.2800/160976

European Union (2013). Quality of life in cities: Perception survey in 79 European cities. In *European Urban Audit* (pp. 1–145). Publications Office of the European Union. https://web.archive.org/web/20220901015201/http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/urban/survey2013_en.pdf

Ferrucci, N. (2012). I giardini storici ed il paesaggio. *Diritto e Giurisprudenza Agraria, Alimentare e Dell'ambiente*, *IV*, 241–247.

Funsten, C., Borsellino, V., & Schimmenti, E. (2020). A systematic literature review of historic garden management and its economic aspects. *Sustainability*, *12*(24). https://doi.org/10.3390/su122410679

Funsten, C., Borsellino, V., & Schimmenti, E. (2021). The appropriate legal and administrative measures: The Florence Charters and legislation governing the identification, listing and protection of historic gardens in Palermo, Sicily. *Restauro Archeologico*, *Special issue 2021*(2), 152–157. https://issuu.com/dida-unifi/docs/ra_special_issue_giardini_storici_2_2021

Goetcheus, C., & Mitchell, N. (2014). The Venice charter and cultural landscapes: Evolution of heritage concepts and conservation over time. *Change Over Time*, *4*(2), 338–357. https://doi.org/10.1353/cot.2014.0018

Groom, B., Drupp, M. A., Freeman, M. C., & Nesje, F. (2022). The future, now : A review of social discounting. *Resource Economics*, *14*, 467–491. https://doi.org/10.1146/annurev-resource-111920-020721

Hamel, P., Guerry, A. D., Polasky, S., Han, B., Douglass, J. A., Hamann, M., Janke, B., Kuiper, J. J., Levrel, H., Liu, H., Lonsdorf, E., McDonald, R. I., Nootenboom, C., Ouyang, Z., Remme, R. P., Sharp, R. P., Tardieu, L., Viguié, V., Xu, D., Zheng, H., & Daily, G. C. (2021). Mapping the benefits of nature in cities with the InVEST software. *Npj Urban Sustainability*, *1*(1), 1–9. https://doi.org/10.1038/s42949-021-00027-9

Harney, M. (2014). *Gardens & landscapes in historic building conservation*. John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107

Hodor, K., Przybylak, Ł., Kuśmierski, J., & Wilkosz-Mamcarczyk, M. (2021). Identification and analysis of problems in selected European historic gardens during the COVID-19 pandemic. *Sustainability*, *13*(3), 1–18. https://doi.org/10.3390/su13031332

ICCD (2022). *Chi siamo*. http://www.iccd.beniculturali.it/it/istituto/chi-siamo

ICOMOS-IFLA (1982). Historic Gardens (The Florence Charter). https://www.icomos.org/images/DOCUMENTS/Charters/gardens_e.pdf

ICOMOS-IFLA (2017). Document on Historic Urban Parks. In *GA2017_6-3-2_HistoricUrbanPublicParks_EN_final20170730.pdf*. https://www.icomos.org/images/DOCUMENTS/General_Assemblies/19th_Delhi_2017/Working_Documents-First_Batch-August_2017/GA2017_6-3-2_HistoricUrbanPublicParks_EN_final20170730.pdf

INSPIRE Thematic Working Group Land Use (n.d.). *INSPIRE Data specification on land use – Technical guidelines*. Retrieved January 11, 2023, from https://inspire.ec.europa.eu/id/document/tg/lu

ISTAT (2017). *Basi territoriali e variabili censuarie*. https://www.istat.it/it/archivio/104317

ISTAT (2022). *Popolazione residente al 1° gennaio : Tutti i comuni*. Dati ISTAT. http://dati.istat.it/viewhtml.aspx?il=blank&vh=0000&vf=0&vcq=1100&graph=0&view-metadata=1&lang=it&QueryId=19101&metadata=DCIS_POPRES1#

Italia Domani (2022). *Site identity enhancement programmes: Historic parks and gardens*. https://italiadomani.gov.it/en/Interventi/investimenti/programmi-per-valorizzare-l-identita-di-luoghi-parchi-e-giardini-storici.html

Jordan, A., & Lenschow, A. (2000). "Greening" the European Union: What can be learned from the leaders of EU environmental policy? *European Environment*, *10*(3), 109–120. https://doi.org/10.1002/1099-0976(200005/06)10:3

Kerschner, F., & Wagner, E. (2015). Sustainability—A long, hard road. *Legal Aspects of Sustainable Development: Horizontal and Sectorial Policy Issues*, 57–78. https://doi.org/10.1007/978-3-319-26021-1_4

Kristiánová, K., & Štěpánková, R. (2015). Green infrastructure of historic city cores – Case studies from Slovakia. *Int. Multidisciplinary Sci. Geoconf. Surveying Geology Mining Ecology Manage., SGEM*, *2*, 437–444. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84964221809&partnerID=40&md5=d4707cc5e3d0329168e467897d951747

Lourdes, K. T., Hamel, P., Gibbins, C. N., Sanusi, R., Azhar, B., & Lechner, A. M. (2022). Planning for green infrastructure using multiple urban ecosystem service models and multicriteria analysis. *Landscape and Urban Planning*, *226*, 104500. https://doi.org/10.1016/J.LANDURBPLAN.2022.104500

Lowenthal, D. (2015). *The past is a foreign country revisited*. Cambridge University Press.

Lusiani, M., Cristina Heras, V., Wijffels, A., Cardoso, F., Vandesande, A., Santana, M., Van Orshoven, J., Steenberghen, T., & van Balen, K. (2013). A value-based monitoring system to support heritage conservation planning. *Journal of Cultural Heritage Management and Sustainable Development*, *3*(2), 130–147. https://doi.org/10.1108/JCHMSD-10-2012-0051/FULL/XML

MA (2005). *Ecosystems and human well-being: Synthesis* (Millennium Ecosystem Assessment, Ed.). Island Press.

Mandle, L., & Natural Capital Project. (2019). Database of publications using InVEST and other Natural Capital Project software. In *Stanford Research Data*. Stanford Digital Repository. https://purl.stanford.edu/bb284rg5424

Masaf (2017). *Norme per lo sviluppo di spazi verdi urbani, L. 10 del 14/01/2013*. https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/11269

Masaf (2022a). *Elenco degli alberi monumentali d'Italia ai sensi della Legge no. 10/2013 e del Decreto 23 ottobre 2014*. https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/11260

Masaf (2022b). 2022.07_ShapefileAMI. *Elenco degli alberi monumentali d'Italia*.

Mazza, I. (2002). Organization and dDecision-making in the hritage sector in Sicily. In I. Rizzo & R. Towse (Eds.), *The economics of heritage: A study in the political economy of culture in Sicily* (pp. 48–62). Edward Elgar Pub.

Ministero della Cultura (2021). *Avviso pubblico per la presentazione di proposte di intervento per il restauro e la valorizzazione di parchi e giardini storici*.

https://media.beniculturali.it/mibac/files/boards/388a5474724a15af0ace7a40ab3301de/SG/PNRR%20Intervento%202.3%20-%20Avviso_Parchi-Giardini+Allegato-signed-signed.pdf

Ministero della Cultura (2022a, June 21). *Assegnazione delle risorse a valere sul PNRR, Missione 1 – Digitalizzazione, innovazione, competitività e cultura, Component 3 – Cultura 4.0 (M1C3), Misura 2 "Rigenerazione di piccoli siti culturali, patrimonio culturale, religioso e rurale", Investimento 2.3: "Programmi per valorizzare l'identità dei luoghi: parchi e giardini storici" del PNRR finanziato dall'Unione europea – NextGenerationEU*. Decreto SG no. 505 21/06/2022 .

Ministero della Cultura (2022b, July 8). *Assegnazione delle risorse alle Regioni: attività di formazione professionale per "Giardinieri d'Arte" - Decreto SG 589 08/07/22 - PNRR M1C3, Investimento 2.3*. Decreto Del Segretario Generale no. 589 Del 08/07/22. https://pnrr.cultura.gov.it/assegnazione-delle-risorse-alle-regioni-attivita-di-formazione-professionale-per-giardinieri-darte-decreto-sg-589-08-07-22-pnrr-m1c3-investimento-2-3/

Ministero della Cultura (n.d.). *Catalogo Generale dei Beni Culturali - esito ricerca architettura a Palermo*. Retrieved January 11, 2023, from https://www.catalogo.beniculturali.it/search?denom=&definizione=&period=&agent=&culturalScope=&province=PA&municipality=Palermo&region=&subject=&numICCD=&classfication=&corporatBody=&techCha=&cis=&site=&typology=Architettura

Ministero della Cultura, & ICCD (2022a). *Catalogo generale dei beni culturali*. https://www.catalogo.beniculturali.it/

Ministero della Cultura, & ICCD (2022b). *Cos'è il catalogo generale dei beni culturali*. https://www.catalogo.beniculturali.it/progetto

Myers, D. (2016). Heritage inventories: Promoting effectiveness as a vital tool for sustainable heritage management. *Journal of Cultural Heritage Management and Sustainable Development*, *6*(2), 102–112. https://doi.org/10.1108/JCHMSD-02-2016-0009/FULL/XML

Natural Capital Project (2021). *Urban InVEST: Designing resilient cities by nature*. Invest Webpage. https://naturalcapitalproject.stanford.edu/software/urban-invest

Neonato, F., Colaninno, B., & Tomasinelli, F. (2018). Green ecosystem services: TEV as tool to take decision for urban Planning. *Economics and Policy of Energy and the Environment*, *2018*(2), 85–112. https://doi.org/10.3280/EFE2018-002005

Nyerges, T. L., & Jankowski, P. (2010). Introduction: Need for geographic information systems in decision support. In *Regional and Urban GIS: A Decision Support Approach* (pp. 3–14). The Guilford Press. https://books.google.it/books?hl=en&lr=&id=QyEIBAixuzkC&oi=fnd&pg=PP1&ots=mzeflftHxY&sig=QGdwytvcAAl-u0Pop9UNhqjIFpA&redir_esc=y#v=onepage&q&f=false

Pappalardo, G., Toscano, S., & Pecorino, B. (2020). Assessing the effects of "appeal to authority" in the evaluation of environmental goods. Evidences from an economic experiment in Mt Etna, Italy. *Aestimum*, *77*, 113–125. https://doi.org/10.13128/AESTIM-8365

Pinto, L. V., Inácio, M., Ferreira, C. S. S., Ferreira, A. D., & Pereira, P. (2022). Ecosystem services and well-being dimensions related to urban green spaces – A systematic review. *Sustainable Cities and Society*, *85*. https://doi.org/10.1016/J.SCS.2022.104072

Pirajno, R., Flaibani, A., Barbera, G., & Raimondo, F. M. (2015). *Guida ai giardini pubblici di Palermo* (R. Pirajno & A. Flaibani, Eds.). Salvare Palermo.

Potschin, M., & Haines-Young, R. (2016). Defining and measuring ecosystem services. In M. Potschin, R. Haines-Young, R. Fish, & R. K. Turner (Eds.), *Routledge handbook of ecosystem services* (pp. 25–44). Routledge.

Regione Siciliana (2020, September 14). *Codici EPSG in uso per la Sicilia*. Sistema Informativo Territoriale Regionale. https://www.sitr.regione.sicilia.it/codici-epsg-in-uso-per-la-sicilia/

Regione Siciliana Assessorato Beni Culturali Ambientali e Pubblica Istruzione (2009). *Azione A - Realizzazione del Catalogo Unico informatizzato Regionale dei BB.CC.AA. intersettoriale ed interdisciplinare*. Programma Operativo Regionale Sicilia 2000/2006. https://www2.regione.sicilia.it/beniculturali/dirbenicult/info/por/202/AzioneA.htm

Remme, R. P., Frumkin, H., Guerry, A. D., King, A. C., Mandle, L., Sarabu, C., Bratman, G. N., Giles-Corti, B., Hamel, P., Han, B., Hicks, J. L., James, P., Lawler, J. J., Lindahl, T., Liu, H., Lu, Y., Oosterbroek, B., Paudel, B., Sallis, J. F., Schipperijin, J., Sosič, R., De Vries, S., Wheeler, B.W., Wood, S.A., Wu, T., & Daily, G. C. (2021). An ecosystem service perspective on urban nature, physical activity, and health. *Proceedings of the National Academy of Sciences of the United States of America*, *118*(22), e2018472118. https://doi.org/10.1073/pnas.2018472118

Sarta, G. (2015). Perimetrazione zonizzazione P.R.G. vigente. In *Comune di Palermo Open Data*. Assessorato Riqualificazione urbana e infrastrutture (area tecnica). https://opendata.comune.palermo.it/opendata-dataset.php?dataset=320

Sharp, R., Douglass, J., Wolny, S., Arkema, K., Bernhardt, J., Bierbower, W., Chaumont, N., Denu, D., Fisher, D., Glowinski, K., Griffin, R., Guannel, G., Guerry, A., Johnson, J., Hamel, P., Kennedy, C., Kim, C. K., Lacayo, M., Lonsdorf, E., Mandle, L., Rogers, L., Silver, J., Toft, J., Verutes, G., Vogl, A. L., Wood, S., & Wyatt, K. (2020). *InVEST 3.12.0.post5+ug.g36c92d2 User's Guide*. The Natural Capital Project, Stanford University, University of Minnesota, The Nature Conservancy, and World Wildlife Fund. https://storage.googleapis.com/releases.naturalcapitalproject.org/invest-userguide/latest/index.html

Sinclair, M., Mayer, M., Woltering, M., & Ghermandi, A. (2020). Valuing nature-based recreation using a crowdsourced travel cost method: A comparison to onsite survey data and value transfer. *Ecosystem Services*, *45*, 101165. https://doi.org/10.1016/J.ECOSER.2020.101165

Towse, R. (2019). *A textbook of cultural economics* (2nd ed.). Cambridge University Press.

Ugolini, F., Massetti, L., Calaza-Martínez, P., Cariñanos, P., Dobbs, C., Ostoic, S. K., Marin, A. M., Pearlmutter, D., Saaroni, H., Šaulienė, I., Simoneti, M., Verlič, A., Vuletić, D., & Sanesi, G. (2020). Effects of the COVID-19 pandemic on the use and perceptions of urban green space: An international exploratory study. *Urban Forestry & Urban Greening*, *56*, 126888. https://doi.org/10.1016/J.UFUG.2020.126888

UNESCO (2015). *Arab-Norman Palermo and the cathedral churches of Cefalú and Monreale*. Nomination File. https://whc.unesco.org/en/list/1487/

UNESCO (2021). The Operational Guidelines for the implementation of the World Heritage Convention, WHC.21/01 (pp. 1–188). https://whc.unesco.org/en/guidelines/

UNESCO (2022). *World Heritage List*. https://whc.unesco.org/en/list/

UNESCO-SCBD Programme (n.d.). *Cultural and Bioligical Biodiversity*. Retrieved February 21, 2023, from https://www.cbd.int/lbcd/

United Nations (2015). *United Nations Sustainable Development Goals - 11 Sustainable cities and communities - Goal 11 targets*. United Nations Sustainable Development Goals. https://www.un.org/sustainabledevelopment/cities/

Valente, D., Pasimeni, M. R., & Petrosillo, I. (2020). The role of green infrastructures in Italian cities by linking natural and social capital. *Ecological Indicators*, *108*. https://doi.org/10.1016/J.ECOLIND.2019.105694

Wen, C., Albert, C., & Von Haaren, C. (2022). Nature-based recreation for the elderly in urban areas: Assessing opportunities and demand as planning support. *Ecological Processes*, *11*(1), 44. https://doi.org/10.1186/s13717-022-00390-0

WHO Regional Office for Europe (2017a). Urban green spaces: A brief for action. https://www.euro.who.int/__data/assets/pdf_file/0010/342289/Urban-Green-Spaces_EN_WHO_web3.pdf

WHO Regional Office for Europe (2017b). Urban Green Space and health: Intervention impacts and effectiveness. https://www.euro.who.int/__data/assets/pdf_file/0007/338074/full-report-for-archiving.pdf

Wise, S., & Craglia, M. (2007). Preface. In S. Wise & M. Craglia (Eds.), *GIS and evidence-based policy making* (pp. ix–xvi). CRC Press. https://doi.org/10.1201/9781420008234/GIS-EVIDENCE-BASED-POLICY-MAKING-MAX-CRAGLIA-STEPHEN-WISE

Wood, S. A., Guerry, A. D., Silver, J. M., & Lacayo, M. (2013). Using social media to quantify nature-based tourism and recreation. *Scientific Reports 2013 3:1*, *3*(1), 1–7. https://doi.org/10.1038/srep02976

World Heritage Convention (1972). UNESCO *Convention Concerning the Protection of the World Cultural and Natural Heritage*. https://whc.unesco.org/archive/convention-en.pdf

Chapter 6 – The Recreational Value of Botanic Garden Events: A Case Study of the Zagara Plant Fair in Palermo, Italy

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Journal of Outdoor Recreation and Tourism, vol. 39 (2022), p. 100565.
https://doi.org/10.1016/j.jort.2022.100565[12]

[12] This published article is printed here with modifications made to formatting and section numbering to harmonize with the rest of the dissertation. Its main text remains the same.

Front Matter

Abstract

Botanic gardens are defined by their mission to maintain living plant collections for scientific research, conservation, display and education. This mission represents the potential ecosystem services that botanic gardens aim to produce, with display and education specifically regarding recreational ecosystem services (RES). Visitors must directly experience botanic gardens to transform these potential RES into real benefits, yet the public may not be interested in studying plants during their leisure time. Thus, botanic gardens turn to events to attract visitors. The objective of this study is to estimate the RES benefits created by a botanic garden event and profile the visitors that it brings into the garden. To do so, a questionnaire was distributed at the Zagara plant festival, held in Spring 2021 at the Palermo University Botanic Garden in Sicily (Italy). Respondents are local, young to middle-aged, mostly female, well-educated, upper to middle class and not accompanying children. Most came to the Zagara to observe, admire or purchase plants. Through the zonal Travel Cost Method (TCM), visitors' marginal consumer surplus is estimated to be 6.16 € and the event's total recreational value is estimated to be 26,464.21 €. The study took place during the second year of the COVID-19 pandemic and responses also indicate that the Zagara filled consequential visitor needs for outdoor social occasions. This study contributes to the literature on RES benefit valuation by applying the well-accepted TCM to the unexplored subject of special events in botanic gardens with the aim of supporting management decisions.

Management Implications

- Botanic gardens are defined by their living plant collections, yet they are also important for human wellbeing;
- Events bring many visitors into botanic gardens, and are responsible for creating social benefits in the form of recreational ecosystem services;
- Garden managers often lack the resources to carry out complicated valuation procedures, but online survey and mapping platforms have made the zonal travel cost method a direct way to estimate the recreational benefits produced by an event, and understand who benefits;
- Such valuations are necessary for gardens to plan events to increase social welfare, optimize ecosystem services and improve inclusiveness.

Keywords: Cultural heritage management; New visitor outreach; Non-market valuation; Ornamental horticulture fairs; Outdoor leisure; Recreational use value.

6.1 Introduction

Botanic gardens must carry out a distinct mission, defined by Botanic Gardens Conservation International (BGCI) as "holding documented collections of living plants for the purpose of scientific research, conservation, display and education" (BGCI, 2019). This mission statement entails the production of different kinds of social benefits. While scientific research and conservation can be carried out without any visitors at all, display and education require public participation. Thus, botanic gardens carry out various public engagement activities related to these missions. These activities are meant to increase the recreational use value generated by botanic gardens, which can also be understood as the benefits generated by recreational ecosystem services (RES).

However, surveys conducted in different parts of the world have shown that garden visitors are not particularly interested in being educated. Instead, they are motivated by hedonistic reasons: visitors to the Mount Coot-tha Botanic Gardens in Brisbane, Australia, primarily come to enjoy themselves, admire the scenery and spend time with family and are not very interested in conservation or learning (Ballantyne et al., 2008); similar preferences have been observed in the United Kingdom (Connell, 2004); in Portugal, visitors primarily come to the Coimbra University Botanic Garden to relax and enjoy themselves (Silva & Carvalho, 2019). A content analysis of Tripadvisor reviews of two UK botanic gardens also confirms that visitor perceptions focus on aesthetics, facilities and services and not on living plant collections, conservation, displays and educational content (Catahan & Woodruffe-Burton, 2019).

Thus, botanic gardens rely on these service or entertainment-oriented offerings to get many of their visitors through the gate. Special events are an increasingly important form of outreach for botanic gardens because they can attract new audiences, repeat and off-season visitors and target specific segments (Benfield, 2013, 2021a; Paiva et al., 2020). Furthermore, they bring in revenue necessary for garden maintenance. Despite the importance of botanic garden events, very little research has been carried out on them.

Botanic gardens are good laboratories for exploring RES valuation because their mission explicitly states their public good aspects, yet they also act as tourist attractions with reliable visitor flow information collected through ticket sales. Furthermore, historic botanic gardens are often located in urban areas, making them very accessible to those individuals most in need of opportunities to reconnect with nature (Sanders et al., 2018). The COVID-19 pandemic has made even more apparent how important recreation in botanic gardens and other urban green spaces is for human well-being (Benfield, 2021; Reeves et al., 2021; Ugolini et al., 2020).

In light of the importance of botanic gardens to people, of events to botanic gardens and the lack of research regarding the social benefits they provide, this study examines an event held by the Palermo University Botanic Garden, the Zagara Spring plant fair, with the objectives of: 1) quantifying the RES benefits generated by the event in terms of recreational use value; 2) profiling the visitors who benefit from such events. The paper is structured as follows: section 2 gives the theoretical background of the study, describing the state of the literature on botanic gardens and events and identifying research gaps; section 3 describes the materials and methods used in this study; section 4 presents the results; section 5 discusses them; section 6 offers some conclusions.

6.2 State of the Literature

6.2.1 The Economic Valuation of Nature's Contribution to Human Wellbeing Through Recreation

As more of the of the world's population is urbanized, opportunities for city residents to connect with nature and understand its value to their own well-being becomes increasingly important (Potschin & Haines-Young, 2016). Nature's value and contribution to human wellbeing has been evaluated in terms of total economic value (TEV) since the 1980s (Turner et al., 1993) and in terms of ecosystem services since the early 2000s (MA, 2005).

The TEV concept came about to correct the market's failure to account for the full value of environmental resources by distinguishing between user values and non-user values (also called passive user or intrinsic values) to account for both development benefits and conservation benefits (Turner et al., 1993). Today, TEV is also applied to cultural and landscape heritage (Tempesta, 2018a; Towse, 2019). In the TEV framework, recreational value is considered part of use value. Total or partial TEV valuation uses the expressed or revealed preferences of an individual's willingness to pay for unpriced goods to assess social value (Turner et al., 1993). TEV-based methods are often applied in monetary cultural ecosystem service valuations (Hermes et al., 2018).

Ecosystem services regard the contributions ecosystems make to human well-being (Haines-Young & Potschin, 2018). The most current ecosystem service framework is the Common International Classification of Ecosystem Services (CICES), which seeks to standardize and operationalize the definitions first provided by the Millennial Ecosystem Assessment (MA, 2005) and The Economics of Ecosystems and Biodiversity (TEEB, 2010). CICES uses a cascade model, where supporting services lead to final services which then produce goods and benefits (Potschin & Haines-Young, 2016). The CICES framework includes three sections of final services: provisioning services; regulation and maintenance services; cultural services. Cultural services differ from the other two because their benefits come exclusively from human-ecosystem relationships. They are equated with the environmental settings that give rise to changes in people's physical or mental states while their benefits are understood as the experiences or capabilities gained from those settings (Potschin & Haines-Young, 2016). RES are the most commonly assessed cultural ecosystem services (Hermes et al., 2018).

The travel cost method (TCM) is one well-established way to economically assess RES benefits (Mayer & Woltering, 2018). It is a non-market, revealed-choice valuation technique that was first elaborated to assess the recreational benefits of American National Parks in the mid-twentieth century (Clawson & Knetsch, 1966). Botanic gardens with entrance fees are congestible club goods, i.e., goods that are non-rival when there is little demand but that become rival when demand is high (Healy, 1994). Such goods may have a physical or monetary barrier to entry which helps avoid damage to the site in question or to visitor experience (Benfield, 2001). Many club goods are run by public or non-profit entities that accept a negative income because they provide public benefits that outweigh their net losses and receive public funding to compensate (Tempesta, 2018a). The TCM uses the cost of accessing a site as a proxy for its non-market recreational value.

There are three established variations of the TCM: individual TCM, zonal TCM and alternative site TCM (Sinclair et al., 2020). Individual TCM correlates the number of trips to a site or amenity to the costs sustained by an individual visitor in a defined period to create a demand function used to estimate consumer surplus. The zonal TCM does this by dividing visitors into zones according to the distance that visitors travel and correlates the frequency rate of visitors from each zone to cost. In alternative site TCM, random utility models produce a demand curve

from a set of best alternatives (Tempesta, 2018a). The zonal TCM is the most appropriate econometric model for hallmark events occurring during a short time-period (Star et al., 2020) that don't have any real substitutes because of their uniqueness (Prayaga et al., 2006) and thus is used here. Another difference between TCM models regards whether the opportunity cost of time is included. Some TCM studies include it in their model by applying a fraction of the average wage to round trip travel time, some individual TCM studies include it as a variable in the regression analysis, and some studies choose to not include it. This study joins the studies that do not include the opportunity cost of time (Affandi et al., 2020; Brida et al., 2017; Heldt & Mortazavi, 2016; Prayaga et al., 2006) with the rationale that the event considered takes place during visitors' leisure time, which could not be used for work, and thus the value placed by visitors might be positive, negative or neutral according to their personal point of view.

6.2.2 TCM Valuations of Botanic Gardens and of Events

The recreational value of botanic gardens has been evaluated within the TEV framework since the 1990s. Most of these studies use in-person surveys to collect data for the TCM alone (Demir, 2014; Garrod et al., 1993), the TCM in combination with contingent valuation (Mwebaze & Bennett, 2012; Tahzeeda et al., 2018) or the TCM in combination with choice-modelling (Affandi et al., 2020). Over time, studies have shifted their focus from the recreational value of the garden in its entirety to a more articulated analysis of the many garden and visitor attributes that influence demand. The research seems to confirm Garrod et al.'s (1993) predictions that more leisure time and interest in "green pursuits" would increase visitor numbers, and that public funding would decrease, putting pressure on gardens to create their own income by charging for visitor services. Table 21 lists TCM studies carried out in botanic gardens along with their individual consumer surplus. Although not a peer-reviewed publication, Oxford Economics' valuations of Kew and Wakehurst botanic gardens are also listed, along with their valuation of two events (Oxford Economics, 2016). Among these previous botanic garden studies, only Affandi et al. (2020) explicitly interprets results within the ecosystem service framework.

Table 21 - Botanic Garden Travel Cost Studies

Study	Location	Size (ha)	Individual consumer surplus
Garrod et al. (1993)	Sheffield Botanic Garden, England	8	£2.24
	Royal Botanic Garden Edinburgh, Scotland	28	£0.91
	Cambridge University Botanic Garden, England	16	£0.35
	Westonbirt Arboretum, England	240	£0.26
Mwebaze and Bennett (2012)	Australian National Botanic Gardens, Australia	90	$27.38
	Royal Botanic Gardens Melbourne, Australia	38	$42.34
	Royal Botanic Garden Sydney, Australia	27	$45.83
Demir (2014)	Kew Royal Botanic Gardens, England	132	£165 .00
Oxford Economics (2016)	Kew Royal Botanic Gardens, England	132	£32.00-£38.00
	- Christmas at Kew 2014	Event	£23.00
	- Kew the Music 2014	Event	£24.00
	Wakehurst Royal Botanic Gardens, England	202	£15.00
Tahzeeda et al. (2018)	National Botanic Garden of Bangladesh. Bangladesh	84	$0.96
Affandi et al. (2020)	Bogar Botanic Gardens, Indonesia	87	$40.90

The application of TCM methods to events is more recent, going back to the early 2000s. While there is a longer tradition of event studies that focus on measuring economic impact via spending rather than the social benefits of special events, these studies regard value for the individual consumer or producer but not for society as a whole. Instead, TCM focuses on welfare, i.e., the benefits produced for everyone (Heldt & Mortazavi, 2016; Prayaga et al., 2006). As of May 28th, 2022, a title, abstract and keyword search for “travel cost method” and “event” in Scopus returns fourteen journal articles dating from 2004 to 2022, ten of which assess recreational use value produced by events with some form of TCM. Local cultural events are evaluated by: Bedate et al. (2004) with the zonal TCM to assess an organ festival in Spain; Prayaga et al. (2006) with the zonal TCM to assess a gem-themed community festival in Australia; Heldt and Mortazavi (2016) with the zonal TCM and choice modelling to estimate the recreational use value of a regional music event in Sweden; Hall and Shuck (2021) with a simplified method to evaluate a historical reenactment event in Yorktown, U.S.A. Outdoor sporting events are evaluated by: Yeh et al. (2016 & 2018) in two studies of the same outdoor

swimming event in Taiwan with an individual TCM and contingent valuation analysis; Du Preez and Lee (2016) with the individual TCM to estimate the recreational value of a mountain biking event held in the Baviaanskloof nature reserve in South Africa; by Schilling et al. (2022) with the individual TCM to estimate the recreational benefits produced by two spear-fishing competitions in Australia. A retail event is evaluated with the individual TCM by Brida et al. (2017) to estimate the recreational use value of a Christmas market in Meran, Italy. A nature event is evaluated by Callaghan et al. (2018), with the zonal TCM to estimate the recreational benefits created by vagrant birdwatching in Pennsylvania, U.S.A. Outside this search, other studies have used the zonal TCM to estimate the value of seasonal natural phenomenon such as wildflower blooms (James et al., 2007; Turpie & Joubert, 2004), seasonal food festivals (Star et al., 2020), and volunteer stewardship events (Daniels et al., 2014). Hutcheson et al.'s (2018) valuation of educational ecosystem services with the zonal TCM also bears note here as part of the category of in-situ experiential cultural ecosystem services grouped together in the CICES framework (Haines-Young & Potschin, 2018). In these TCM event studies, only Callaghan et al. (Callaghan et al., 2018) and Hutcheson et al. (2018) mention RES, with the former only using the term as a keyword but not discussing it in the paper. However, all note how their monetary valuations need to be considered within their complex economic, social and environmental systems. Considering recreational use value assessments within the holistic framework of ecosystem services might help achieve that aim.

Indeed, in a recent literature review of trends in RES research, Hermes et al. (2018) observe that while outdoor recreation has been studied for decades, few studies take an ecosystem service perspective. The authors see the links between landscapes, RES benefits and beneficiaries as an important emergent issue in RES scholarship. The most recent version of the UN's System of Environmental Economic Accounting – Ecosystem Accounting (SEEA-EA) also notes that both the ecosystem's setting and human inputs of time and resources are necessary parts of the flows of these experiential benefits from ecosystems to people (SSEEA-EA, 2021). Some of the studies reviewed by Hermes et al. (2018) look at these benefit flows by evaluating the RES contribution made by specific services or amenities (Heagney et al., 2018; Kulczyk et al., 2018; Moseley et al., 2018; van Berkel et al., 2018), but do not consider events. Thus, events seem like a logical next step in investigating how human inputs influence RES benefits.

In light of the above, this paper contributes to filling the research gap at the intersection of three bodies of research: the recreational use value of botanic gardens; the recreational use value of events; the effect of services and amenities on RES benefit flows, bringing these three themes together for the first time. Botanic gardens, along with other public green spaces, are complex systems where both human and natural resources contribute to social welfare. While recreational benefit valuations of botanic gardens have been performed in the past, this is the first valuation of a botanic garden event. As Schilling et al. (2022) note, it is important to evaluate events separately from their main sites because they are often missed in comprehensive site evaluations. Events are becoming increasingly important parts of visitor engagement and assessments of their RES benefits will help gardens to track progress year to year, evaluate the social impact of different kinds of events, and make informed decisions and trade-offs that consider RES within the wider framework of their mission and related ecosystem services. Furthermore, this study is also valuable because it occurred during the global COVID-19 pandemic. Although the pandemic is not its primary focus, it contributes to the growing body of research documenting the importance of outdoor recreation during this historic moment (e.g., Davies & Sanesi, 2021).

6.3 Materials and Methods

In this study we apply the Zonal TCM to a single event lasting four days (the 20th edition of the Zagara plant fair held from Thursday June 10th to Sunday, June 13th, 2021) with the following zonal TCM procedure adapted from Tempesta (2018a) and Star (2020):

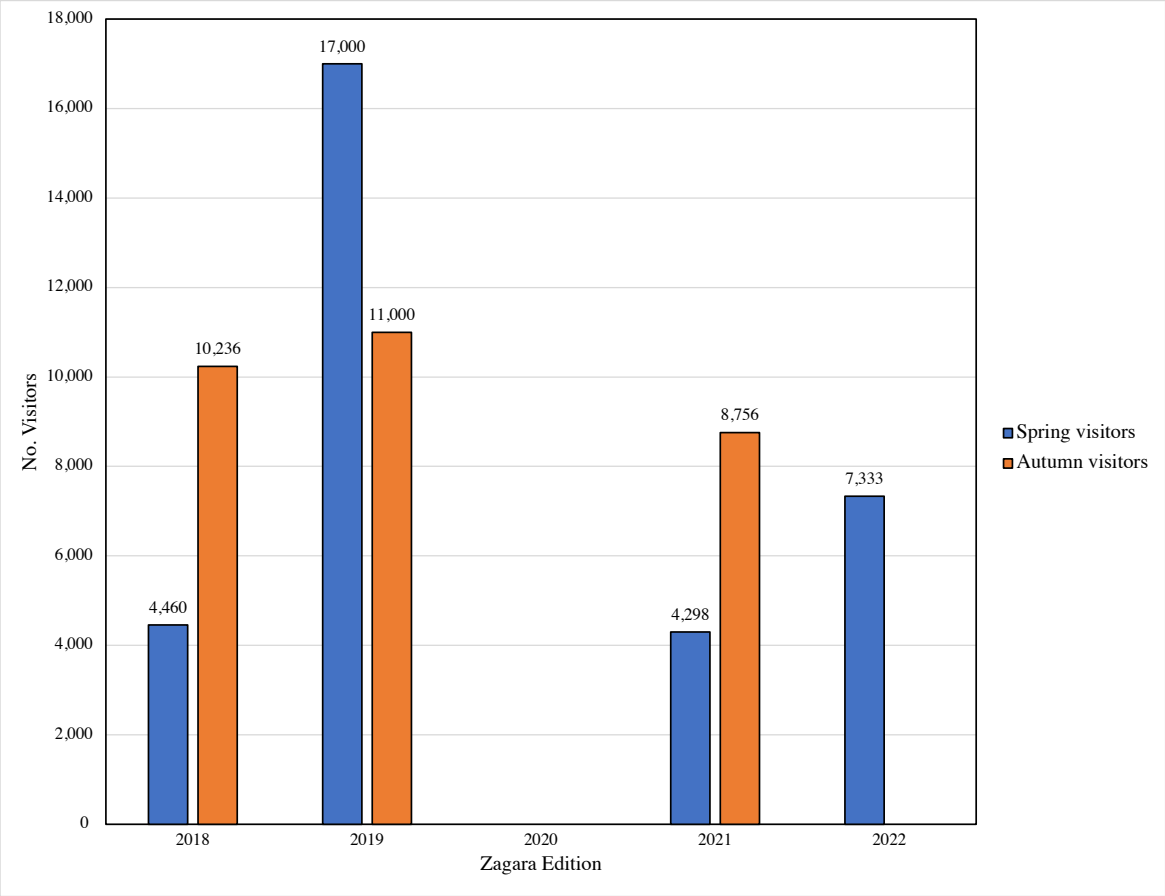
1) Site study;
2) Visitor data collection and processing;
3) Identification and description of the visitor catchment area;
4) Determination of zones;
5) Calculation of the trip generation function (TGF);
6) Price increase simulation;
7) Calculation of the uncompensated demand function;
8) Estimation of the consumer surplus and recreational use value.

6.3.1 Site Study - The Palermo University Botanic Garden's Zagara Plant Fair

The Palermo University Botanic Garden is one of the sixty-four botanic gardens recognized by the *Società Botanica Italiana Onlus* (SBI) (SBI, 2011) and one of the sixteen Italian botanic garden members of BGCI (BGCI, 2022). Located in Palermo's historic city center, it was founded in 1789 and opened to the public in 1795. Currently, it covers an area of just over 10 ha with a living collection of about 1,700 taxa (Speciale, 2018) that traces the history of plant classification and acclimatation in Europe (Viola & Speciale, 2021). In 2019 the garden had 168,114 visitors, 46,605 visitors in 2020 and 76,189 visitors in 2021, with 2020 and 2021 affected by the pandemic (Schicchi & Gagliano Candela, 2021). While the garden is managed by the university, ticket sales and some visitor services are managed by an external cooperative. Visitors are charged for entry, with differentiated prices for children, seniors, students, groups etc. (Orto Botanico, 2022).

During the last few years, events in the botanic garden have increased greatly (Schicchi & Gagliano Candela, 2021). Among these, the Zagara plant fair is a biannual event held in Spring and in Autumn. Specialist nurseries from throughout Italy are invited to display and sell their wares inside the garden, lectures, seminars and exhibits are organized and a reduced entry fee is offered. The Zagara began in 2010 (UNIPA, 2010), and has since become a regionally important event (Schicchi & Gagliano Candela, 2021). In 2019, the Spring edition peaked with an unprecedented 17,000 visitors. That year's Autumn edition brought in about 11,000 visitors. and together, the 2019 editions accounted for just over 16% of annual visits. In 2021, the Spring edition (the focus of this article) brought in 4,298 visitors, and the Autumn edition brought in 8,756 visitors, together accounting for 28% of annual visits. It is interesting to note that while 2021 Zagara entry tickets were less than in 2019, the share of total annual visits increased by 12 percentage points. The 2022 Spring edition is the most recent Zagara festival at the time of writing this paper, which brought in 7,333 visitors (Surano, 2021). Figure 15 shows Zagara visitation since 2018.

Figure 15 - Zagara Visitor Attendance Since 2018



Both 2020 editions were cancelled due to COVID-19, making the Spring 2021 Zagara the 20th edition of the event. As for other historic gardens (Benfield, 2021c; Hodor et al., 2021), the pandemic strongly impacted garden visiting and management. During 2020, the Palermo University Botanic Garden was obligatorily closed to the public from March–May and from November–December. Thus, it was fully open on 222 days during 2020, while it had been fully open on 363 days during 2019. Total entry tickets fell by −72.3%, from 168,114 in 2019 to 46,605 in 2020. Normally, a significant portion of entry tickets comes from festivals and fairs (28.67% in 2019), but in 2020 the subtotal of entry tickets from just events fell by −89.2% (from 48,197 in 2019 to 5,194 in 2020). Revenue normally received from renting spaces for special events or film/photography shootings was also lost with a year on year (YOY) difference between 2019 and 2020 of −79.3%. The loss of revenue also diminished funding to pay those gardeners with seasonal contracts (Schicchi & Gagliano Candela, 2021), and quarantine measures and precautionary rotational schedules also caused a temporary reduction of manpower. After such a difficult year, the Spring 2021 Zagara represented an important opportunity to bring in funding and to reconnect with garden visitors.

6.3.2 Visitor Data Collection and Processing

During the Zagara (June 10th-13th, 2021), data was collected from visitors with a questionnaire on the online platform, Google Forms. The questionnaire was made available in Italian and in English. It consists of 36 questions in eight sections: Introduction; Information on participation and privacy; Where visitors come from; How visitors travel; Costs incurred to participate in

the event; Motivation for visiting; Visitor characteristics; Visitor satisfaction. Visitors accessed the questionnaire via a quick reference (QR) code on a flyer linking to the online questionnaire. Participants without a smart phone or personal computer were assisted by interviewers who filled out the questionnaire for them.

Participation was recruited by interviewers near the exit, instructed to approach whoever was in front of them. After interception, they presented the research project, offered the flyer and answered any questions. Most visitors preferred to fill out the questionnaire after their visit.

This mixed in-person/online method had several advantages. Sicily had just been allowed to reopen museums (botanic gardens are considered outdoor museums) on May 17th, 2021, (Italian Ministry of Health, 2021), and people were still worried about the transmissibility of the SARS-CoV-2 virus. Participants appreciated being able to access the online questionnaire from their own device without having to touch pens and papers. The in-person recruitment motivated participation and the flyer taken home acted as a reminder.

Recruitment quotas were based on the predicted visitor turnout for the event. In light of the pandemic, management aimed to have about 300 people in the garden per time slot. They also encouraged online reservations to better manage visitor flows by offering a discount (4 € online vs. 5 € at the gate). Based on the target number of visitors per time slot, total visitor turnout was expected to be 4,200. As stated above, the actual visitor turnout was 4,298.

A useable response target of at least 5% of the total visitor turnout was set. Because a response rate of about 25% was predicted based on the responses received by Friday morning, the number of flyers was raised to 20% (0.05/.25) of the expected visitor turnout, i.e., 840, which was rounded up to 850. Hourly quotas were established so that about every fifth exiting visitor would be given a flyer.

The online questionnaire was closed one week after the event commenced. Data was then transferred to a Microsoft Excel spreadsheet (version 16.59) for analysis with XLSTAT (version 2022.1.2). While a total of 290 questionnaires were submitted, only 276 responses could be considered. 14 questionnaires were discarded because they were incompletely or incorrectly filled out. This final sample size was evaluated using Scheaffer's sample size formula (Scheaffer et al., 2012):

(1)

$$n = \frac{Ns^2}{(N-1)*\frac{B^2}{4}+s^2}$$

where:

n = sample size

N = population size

B = estimated bound on the error

s^2= sample variance

According to Scheaffer's formula, the minimum adequate sample size to estimate the mean travel cost for a population size of 4,298, a sample variance of 166.48 and a bounded error of 1.55€ is 261. Thus, this study's sample size of 276 is adequate, accepting that bounded error.

Participation costs were calculated for each responding visitor as the sum of their travel and entrance costs. These comprised fuel costs, public transport costs, entry ticket costs, accommodation costs and other costs. Although they were collected, food and beverage costs and shopping (exhibited plants and products) costs were not included. It was decided that these were not directly related to visitor frequency and would introduce variability related to other factors. As discussed in section 2.1, the opportunity cost of time was not included.

To calculate travel costs, visitors were asked to declare their municipality of same-day origin and their method of transportation. Visitors coming from Palermo were also asked to specify their municipal district of origin. The center of each administrative area was determined (see section 3.3) and Google Maps was then queried for the distance in km and travel time necessary for a roundtrip from the center of the administrative boundary of declared origin to the botanic garden entrance, according to Google's method of transportation options (private motor vehicle, public transportation, on foot, by bicycle). Should Google Maps suggest multiple routes, the first suggestion was used.

For visitors traveling in four or two-wheel private vehicles, roundtrip costs were calculated according to the formula:

$$C_{pv} = \frac{M * CC * km_h}{n} \quad (2)$$

where:

C_{pv} = private vehicle roundtrip travel cost

M = mileage compensation coefficient, i.e., 1/5 here

CC = cost of one liter of fuel, i.e., 1.61€ here

km_h = roundtrip distance from center of municipality or Palermo district to the Palermo University Botanic Garden entrance

n = number of passengers, including the driver

Fuel costs were calculated according to the Italian Ministry of Ecological Transition's average monthly fuel price for unleaded petrol for June 2021: 1.61€/liter (Italian Ministry of Ecological Transition, 2021). According to Italian public administration practice (*Regione Siciliana*, 2001), a mileage compensation coefficient of 1/5 was applied, meant to underestimate the fuel economy of automobiles enough to account for other expenses such as insurance, maintenance etc.

Public transportation travel costs were calculated using the bus, metro or train roundtrip ticket prices suggested by Google Maps. Visitors traveling on foot, by bike or via electric vehicle had no fuel or public transportation costs.

Regarding the issue of attributing travel costs to multiple sites, this was dealt with after examining responses to a question asking visitors if they had come specifically for the Zagara. Overall, 78% of participants said yes, 6% said no and 16% did not respond. However, of the 22 participants staying in paid lodging, only 27% said yes, 46% said no and 27% did not respond. Thus, most visitors from the local-regional area left home to participate specifically in the Zagara, and the problem of attributing travel costs to multiple sites was only considered for visitors staying in paid lodging. The share of their accommodation costs used to participate in the Zagara was calculated as a fraction of time spent for the visit in the botanic garden divided by time available for touristic activity (determined as 12 h). This was then applied to respondents' mean declared per-person accommodation costs so that any price variability related to different classes of accommodations would be removed.

Finally, other costs declared by visitors included: parking; guided tours; entry ticket for caregivers; electric scooter rental fees.

6.3.3 Determination of Zones

To determine the zones, the aggregate mean distance travelled by visitors from each administrative area of origin was used to rank them by distance from their center to the botanic garden entrance. All non-Sicilian residents had a same-day origin on the island, e.g., a hotel, bed and breakfast, second home, friend or family member's home. Since this study was conducted in areas with roads shaped by the coastline and mountain chains, it was felt that distance "as the crow flies" significantly strays from the distance that people actually travel. While early zonal travel cost studies calculated zones via straight geodesic distance rather than real travelled distance (Clawson & Knetsch, 2013), today online travel route planning platforms such as Google Maps have simplified calculating more detailed travel distances and has even made it possible to substitute survey questionnaires with more easily accessible social media data (Sinclair et al., 2020).

A zone width of ten km was chosen because it shows the different visitation rates within Palermo's districts and surrounding towns and covers all zones with more than one response as far as zone five, including 91.67% of responses. In line with Tempesta (2018a), the low number of visitors from Sicily's inland areas and the small populations of inland towns made it preferable to enlarge zone six to a width of 50 km (i.e., distances from 50.01 to 100 km) so that the zone would include more than one response and more than one municipality. Finally, zone seven comprises all remaining municipalities of same-day origin. The population data found in step two for individual administrative areas was aggregated to get the data for each zone. The resulting zones are shown in Table 22.

Table 22 - Travel Cost Zones

Zone *h*	Mean distance from entrance (km)	Included administrative areas[a]	Visitor frequency $V_h/P_h*1{,}000$	Mean participation cost C_h
1	0-10	Palermo - I Palermo – VIII Palermo – II Palermo – III Palermo – IV	0.42	6.40 €
2	10.01-20	Villabate Ficarazzi Palermo – V Palermo – VII Palermo - VI Altofonte Belmonte Mezzagno Bagheria Santa Flavia Misilmeri	0.17	8.77 €
3	20.01 - 30	Capaci Altavilla Milicia Marineo	0.11	10.05 €
4	30.01 - 40	Montelepre Monreale Carini	0.06	12.39 €

		Cinisi		
5	40.01 - 50	Mezzojuso Partinico Terrasini Termini Imerese	0.11	15.46 €
6	50.01-100	Vicari Lascari Alcamo Castronovo di Sicilia	0.09	25.57 €
7	>100	Sclafani Bagni Castelvetrano Cianciana Favara Agrigento Randazzo Messina Catania San Gregorio di Catania Ragusa Avola Modica	0.02	55.63 €

[a] Administrative areas in order of closest to farthest.

6.3.4 Calculation of the Trip Generation Function (TGF)

The TGF can be defined as:

(3)

$$f(C_h) = \frac{V_h}{P_h} * 1{,}000$$

where:

C_h = real mean zonal participation costs, i.e., travel costs and entrance costs

V_h = visits from zone h

P_h = population of zone h

Once the two variables for the TGF were determined, visitor frequency per zone and participation cost per zone, they were graphed in a scatterplot to derive a relationship through ordinary least-squares regression. Linear, exponential, logarithmic and double-logarithmic trendlines were attempted and tested for goodness of fit according to their F statistic (F), adjusted coefficient of determination (R^2), and the statistical significance of their regression coefficients (p-values). The trendline that best fit the data was used as the TGF. The resulting function was then tested for independence of residuals using the Durbin-Watson test and homoscedasticity of residuals using the Breusch-Pagan and White test. If heteroskedasticity was found to be present, general least squares (GLS) regression was used to correct the model.

6.3.5 Price Increase Simulation

To estimate the demand curve, the TGF was used to simulate a variation in ticket price. This price increase simulation can be described accordingly:

$$V_{hk} = s(C_h + CA_k)P_h \tag{4}$$

where:

V_{hk} = visits from zone h given k price increase

C_h = real mean zonal participation costs, i.e., travel costs and entrance costs

CA_k = simulated additional participation costs given k price increase

P_h = population of zone h

Gradual 10€ increases to ticket price were added to the mean participation cost for each zone. The choice of 10€ was based on the average difference between the zone's mean costs. Visitation rates for each price increase were then calculated using the TGF. Finally, the total expected number of visitors was calculated for each price increase by summing the number of visitors per zone accordingly:

$$V_{.k} = \sum_{h=1}^{z} V_{hk} \tag{5a}$$

where:

$V_{.k}$ = total visits from all zones given k price increase

V_{hk} = visits from zone h given k price increase

6.3.6 Calculation of the Uncompensated Demand Function

Finally, the uncompensated demand function was calculated, defined as

$$CA_k = c(V_{.k}) \tag{6a}$$

where:

CA_k = simulated additional participation costs given k price increase

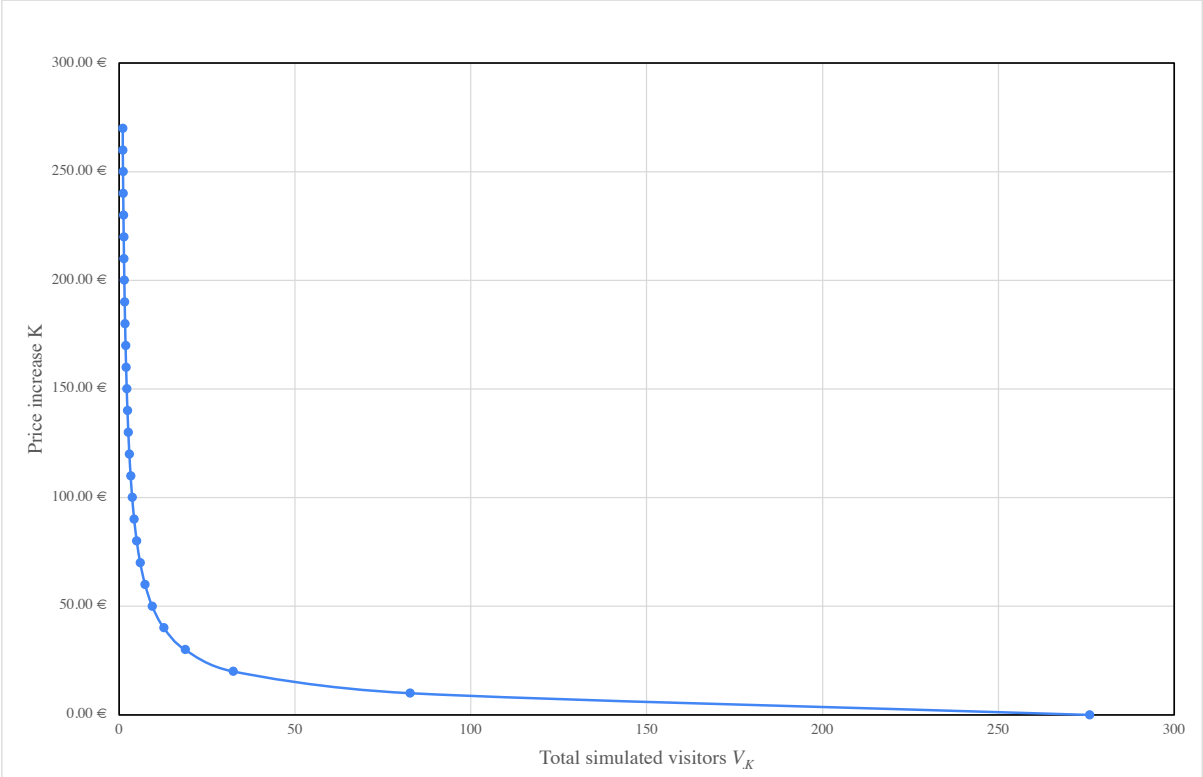
$V_{.k}$ = total visits from all zones given k price increase

Like for the TGF, price increase and total expected visitors were graphed in a scatter plot to find the most appropriate demand function through ordinary least squares regression. Linear, exponential, logarithmic and double-logarithmic trendlines were attempted and tested for goodness of fit according to their F statistic (F) and adjusted coefficient of determination (R^2), and the statistical significance of their regression coefficients (p-values). The trendline that best fit the data was used as the demand function. Like before, the resulting function was then tested for independence of residuals using the Durbin-Watson test and homoscedasticity of residuals using the Breusch-Pagan and White test. If heteroskedasticity was found to be present, the regression model was corrected using GLS regression.

6.3.7 Estimation of the Consumer Surplus and Recreational Value

The recreational value of the festival was calculated by integrating the uncompensated demand function [6] from zero to the number of surveyed visitors (276) (Figure 16). Numerical integration was carried out using Reiman sums with the trapezoid rule and 1€ intervals. The resulting value was then divided by the number of surveyed visitors, thus deriving the individual consumer surplus. The total recreational use value generated by the Zagara was found by multiplying that by the total number of visitors attending the event.

Figure 16 - Demand Curve from the Log-log Regression of the Price Increase Simulation



6.4 Results

6.4.1 Visitor Characteristics

Table 23 describes characteristics of responding visitors by absolute frequency and percentage.

Table 23 - Visitor Characteristics, Trip Characteristics and Travel Motivations

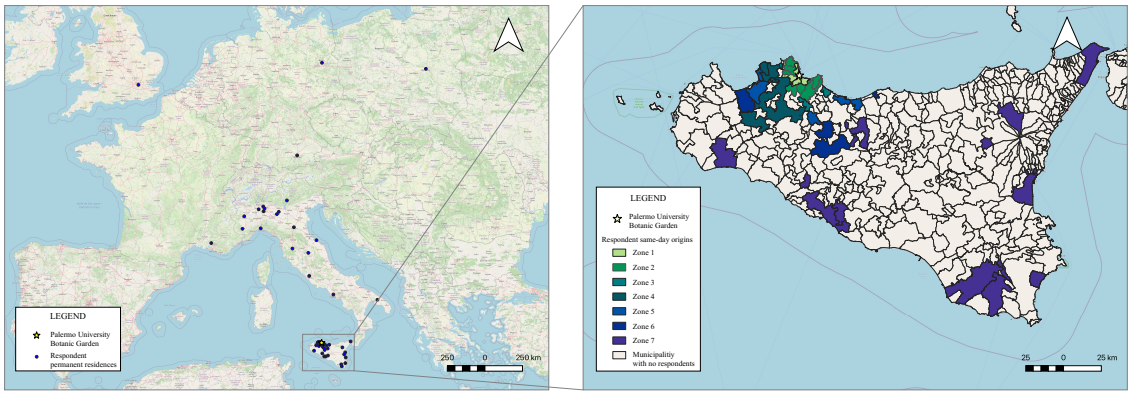
Index	Index value	Frequency (no.)	Ratio (%)
Residency	City of Palermo	192	70
	Rest of Metropolitan area of Palermo	39	14
	Rest of Sicily	20	7
	Rest of Italy	20	7
	Foreign state	5	2
Transportation	Private car	188	68
	On foot	43	16
	Motorcycle/scooter	17	6
	Bicycle	11	4
	Public transport	11	4
	Hired coach	4	1
	Electric personal transport	2	1
Age groups	≤ 18	11	4
	19 – 30	60	22
	31- 40	57	21
	41 - 50	55	20
	51 – 60	47	17
	61 – 70	36	13
	71 - 80	10	3
Declared gender	Male	107	39
	Female	167	60
	Other/Undeclared	2	1
Educational attainment	Elementary school or less	1	…
	Middle school diploma	12	5
	Secondary vocational school	2	1
	High School diploma	72	26
	Undergraduate degree	39	14
	Graduate or 5-year University degree	88	32
	Postgraduate (PhD or other)	61	22
	Not stated	1	…
Annual family income	No income	20	7
	1 - 10,000 €	18	7
	10,001 - 15,000 €	18	7
	15,001 - 26,000 €	58	21
	26,001 - 55,000 €	91	33
	55,001 - 75,000 €	25	9
	75,001 - 120,000 €	8	3
	Over 120,000 €	3	1
	Not stated	35	12
Household composition	Single-person household	32	11
	Multi-person household, no children	184	67
	Multi-person household, with children	47	17

	Not stated	13	5
Botanic garden attendance	First time	40	15
	Once a year	107	39
	2-4 times a year	81	29
	5-8 times a year	34	12
	9-12 times a year	7	3
	> 12 times a year	6	2
	Not stated	1	…
Zagara attendance	First time	86	31
	Other times, but not every year	54	20
	About once a year	43	16
	Every time	92	33
	Not stated	1	…
Association/ group membership	Yes	24	9
	No	248	90
	Not stated	4	1
Came specifically for the Zagara	Yes	215	78
	No	18	6
	Not stated	43	16
Main motive for attending	To observe the beauty of plants	127	46
	To purchase plants	89	32
	To experience outdoor wellbeing	24	9
	To spend time with friends & family	20	7
	A combination/ other motives	16	6
Comments	Criticisms/ suggestions	70	25
	Compliments	12	4
	Both/ neutral	9	3
	Not stated	185	67

*Some percentages had to be rounded up or down discretionarily so that the ratios sum to 100.

Most respondents are residents of the city of Palermo (70%), with some from the rest of the metropolitan area of Palermo (14%), some from the rest of Sicily (7%), some from the rest of Italy (7%) and very few from outside Italy (2%). Figure 17a. shows a map of respondents' permanent residences and Figure 17b. shows a map of their same-day departure origins. Respondents' residences indicate the event's draw while same-day departure origins determine same-day travel costs.

Figure 17 - Respondents' Permanent Residences (a) and Same-day Departure Origins (b)



3a 3b

Respondents' travel distances varied between two and 664 km roundtrip, with a mean distance of 42 km, a median distance of 12 km and an interquartile range from five to 26 km. Most respondents travelled by car (68%), followed by on foot (16%), by motorcycle or scooter (6%), by bicycle (4%), by public transport (4%), by hired coach 1%, and by electric personal transport (1%).

Most respondents are young to middle-aged adults with more than half being distributed in the 19–30 (22%), 31–40 (21%) and 41–50 (20%) age classes. The sample population includes just over 20% more females than males as well as a few respondents declaring "other/I prefer not to say" (1%).

The sample population is well educated, with just over 68% of respondents having a university degree. Considering that ISTAT's 2020 workforce data found that fewer than 12% of Sicilians have any university degree, this number is quite high (ISTAT, 2020).

The sample population is mostly upper-middle class. The most frequently reported annual family income is 26,001 € – 55,000 € (33%), followed by 15,001 € – 26,000 € (21%).

Regarding household composition, most respondents (67%) report being part of a multi-person household without children.

Affinity for botanic garden recreation was measured by asking how often respondents visit the botanic garden, how often respondents attend the Zagara, and if respondents are part of a group or association dedicated to nature, plants, gardens, history or cultural heritage. Most respondents were new or occasional visitors to the botanic garden, with 15% visiting for the first time, 39% visiting once a year, and 29% visiting two to four times a year. The remaining 17% visit more than four times a year. The majority of Zagara attendance was fairly evenly split between regular attendees coming every edition (33%) and new attendees coming for the first time (31%). The remaining respondents declared coming just once a year (20%) or attending before but not every year (16%). 9% of respondents reported being members of a pertinent association or group.

Regarding motivations, most respondents report coming to the Zagara plant fair "to observe the beauty of the plant kingdom" (46%) or "to purchase plants" (32%). The remaining respondents came to experience outdoor wellbeing (9%), spend time with friends and family (7%) or other motives (6%). Declared spending shows that respondents were probably shopping recreationally rather than building gardens: they spent between €0 and €250 on purchases, with a mean of €36.81, a median of €25 and an interquartile range from €10 – €50.

Forty-two (15%) respondents made no purchases and seven (3%) did not respond to the question.

6.4.2 Visitor Experience

Participants were asked to rate their experience from one to five, with one indicating poor and five indicating excellent. Responses ranged from 2 to 5, with a mean of 4.41 (95% confidence interval between 4.33 and 4.50) and a standard deviation of 0.73.

Finally, they were also asked for a few short comments. 67% had nothing to say, 25% offered criticisms or suggestions, 4% offered compliments, and 3% offered neutral statements or a mix of criticisms and compliments. Criticisms regarded: the lack of adequate food and beverage services; the fewer number of stands, events, and guided tours compared to past editions; the high ticket price and a lack of discounted multi-day and family ticket options; the poor upkeep of both the plants and the pathways in the garden, discomfort from the long entrance line and mosquitos; the unorganized layout of the stands and their plants; deficient signage, maps and other information; the lack of carts to carry purchases to the exit; the short duration of the festival. Positive comments remarked on how nice it was to be back in the garden together after COVID-19 closures, recognitions of the Palermo University Botanic Garden staff's special efforts to hold the festival during difficult times, and the general beauty of the garden and pleasantness of the event.

6.4.3 Visitor Consumer Surplus and Recreational Use Value

The mathematical form, and the statistical parameters of the four possible TGFs are shown in Table 24.

Table 24 - Comparison of Regression Models for the TGF Function[a].

Regression	Equation	Statistic parameters	
Linear	$y = 29.36 - 74.03x$	F	2.44
		Adjusted R^2	0.19
		P-value (a)	0.02
		P-value (b)	0.18
Exponential	$y = e^{(3.25-3.94x)}$	F	5.35
		Adjusted R^2	0.42
		P-value (a)	0.00
		P-value (b)	0.07
Logarithmic	$y = -15.66-14.94 \ln(x)$	F	16.33
		Adjusted R^2	0.72
		P-value (a)	0.15
		P-value (b)	0.01
Log-log	$\ln(y) = 1.18 - 0.65 \ln(x)$	F	20.64
		Adjusted R^2	0.77
		P-value (a)	0.02
		P-value (b)	0.01

[a] The preferred regression model is highlighted in green.

The log-log trendline shows the best fit and significance, defined by the equation:

(5b)

$$\ln(y) = 1.18 - 0.65 \ln(x)$$

The Durbin-Watson test confirms that residuals are independent and the Breusch-Pagan and White test both confirm that the residuals are homoscedastic.

The mathematical form, and the statistical parameters of the four possible consumer demand functions are shown in Table 25.

Table 25 - Comparison of Regression Models for the Demand Function[a]

Regression	Equation	Statistic parameters	
Linear	$y = 144.51 - 0.75x$	F	8.67
		Adjusted R^2	0.23
		P-value (a)	0.00
		P-value (b)	0.01
Exponential	$y = e^{(4.87-0.02x)}$	F	92.42
		Adjusted R^2	0.78
		P-value (a)	0.00
		P-value (b)	0.00
Logarithmic	$y = 199.41-47.40 \ln(x)$	F	158.37
		Adjusted R^2	0.86
		P-value (a)	0.00
		P-value (b)	0.00
Log-log	$\ln(y) = 5.57 - 0.74 \ln(x)$	F	208.45
		Adjusted R^2	0.89
		P-value (a)	0.00
		P-value (b)	0.00

[a] The preferred regression model is highlighted in green.

The log-log trendline shows the best fit and significance, defined by the formula:

(6b)

$$\ln(y) = -5.57 - 0.74 \ln(x)$$

While the Durbin-Watson test confirm that residuals are independent, the Breusch-Pagan and White tests both confirm that the residuals for this model are heteroscedastic. However, the corrected formula maintains the same form and rounded coefficients.

The marginal consumer surplus of the Zagara, which is derived by integrating the uncompensated demand function [6] from zero to the number of surveyed visitors (276) using Reiman sums with the trapezoid rule and 10€ intervals, amounts to 1,699.42 €/276 visitors or 6.16 € per visitor.

Thus, considering the total number of visitors to the event was 4,298, the total recreational use value is estimated to be 26,464.21 €.

6.5 Discussion

To contextualize this study's results, they are compared with some similar TCM investigations, although it should be noted that non-market valuation studies are always unique because each site or amenity is embedded in a different socio-economic context.

In terms of the Zagara's draw, this study's sample population has most in common with other investigations of local cultural events (Bedate et al., 2004; Prayaga et al., 2006), or retail events (Brida et al., 2017). Local residents of the municipality of Palermo are the primary beneficiaries

of the recreational value generated. We can conjecture from experience that the Zagara has always had a mostly local participant population, which was probably heightened by the COVID-19 pandemic. Visitor entrance numbers were purposely contained and there were also fewer nursery stands from outside Sicily in respect to previous years. It should be noted that while a local visitor population may lower the numerical recreational value estimate, it is indicative of a community-oriented form of consumption. This proximity tourism has grown in popularity since the advent of the pandemic and has several desirable aspects regarding sustainability (Lebrun et al., 2021). A more complete view of these RES benefits might be achieved within the greater framework of ecosystem services if regulation and maintenance disservices from visitor and nursery travel were also considered. With more local visitors and fewer off-island nurseries, greenhouse gas emissions attributable to the event would probably be diminished.

In terms of participant characteristics, a positive socio-cultural aspect to emerge from this study is the Zagara's involvement of younger age-groups. Other demographic studies of European garden visitors show that they tend to be older, well-educated, and female (Connell, 2004; Paiva et al., 2020; Silva & Carvalho, 2019). This study's demographics are similar to these cited studies, with the exception of age, where an increased involvement of teenagers and young adults can be observed. This shows that events such as the Zagara may be particularly effective in involving younger age-groups and brings up the question whether events such as the Zagara might be tailored specifically to attract underrepresented groups. Social inclusion is a challenge for many botanic gardens, science museums and urban green spaces, and past studies have shown that it is best addressed by participatory community-oriented events (Dawson, 2014; Rigolon, 2016; Vergou & Willison, 2016).

Indeed, responses to questions measuring affinity for botanic garden recreation confirm assertions made by other authors (Benfield, 2013; Benfield, 2021a; Paiva et al., 2020) that events bring in new visitors. Future studies might investigate whether these new event visitors then become regular garden visitors.

In terms of visitor motivation, the Zagara can be judged a model example of an event that also remains true to the botanic garden's mission, especially regarding public engagement through display and education. Most respondents declared coming to the Zagara to observe, admire or purchase plants. While doing so, they exchanged knowledge and views with fellow enthusiasts and with the exhibiting nurserymen. The mean amount spent of €36.81 indicates that the shopping was mostly recreational, much like Brida et al.'s (2017) study of an Italian Christmas market. Considering the average costs of ornamental plants in Italy, ranging from a few euros for small succulents or herbaceous plants to hundreds of euros or more for mature trees or rare species (e.g., Piante Faro, 2020), plant collectors or landscape professionals making purchases plants to develop a collection or a property would spend much more.

In their comments, visitors showed that they particularly appreciated the event in light of the COVID-10 pandemic. In fact, the Zagara plant fair was the first event to be held by the Palermo Botanic Garden after a year of closures. The World Health Organization declared the disease to be a public health emergency of international concern on January 30th, 2020, and a pandemic on March 11th, 2020, (WHO, 2020) and since then, the COVID-19 pandemic has become part of everyday life. Although not the focus of this study, results also show how botanic gardens and other urban green spaces have become increasingly important because they have offered psychological relief while lockdowns are in effect and have offered social spaces perceived as safe when restrictions are lifted (Reeves et al., 2021; Ugolini et al., 2020).

Regarding this study's economic assessment of the Zagara's recreational value (a consumer surplus of 6.16 € per visitor and a total recreational use value of 26,464.21 €), it can be best compared to the marginal consumer surplus from recreational value studies of other botanic

gardens. The Zagara's estimated individual consumer surplus falls on the low side within their range of values (see Table 1), which go from about $1-$40. Again, this is due to local community participation, and in part due to COVID-19 related admissions capping for the analyzed event.

6.6 Conclusions

Botanic gardens are defined by a public utility mission regarding scientific research, conservation, display and education, and thus need to evaluate their contributions to society beyond their economic impact. The objectives of this study were to evaluate the RES benefits of a botanic garden event in terms of recreational use value and profile the beneficiaries. To do so, the case study of the Zagara plant fair, held by the Palermo University Botanic Garden from June 10th-13th in 2021, was assessed with the zonal TCM procedure. Although they are designed rather than wild landscapes, botanic gardens are important forms of natural capital that are often located in urban environments. Thus, it is appropriate to consider their welfare benefits in terms of ecosystem services. The TCM provides a monetary valuation of this social welfare attributable to recreational use, i.e., RES benefits.

This paper offers a first consideration of the RES benefits generated by the human input of an event in an urban green space, providing quantitative data for accurate and locally relevant ecosystem service valuations. In the past, value transfer has been used to estimate cultural ecosystem services, but if nothing more appropriate is available the values used are taken from studies of geographically or typologically different sites (Cheng et al., 2019; Lautenbach et al., 2019), with less accurate results (Sinclair et al., 2020). Furthermore, RES depend on physical and experiential interactions with environmental settings (Potschin & Haines-Young, 2016). Without visitors, such areas have potential RES, but do not actually generate benefits (Mayer & Woltering, 2018). Thus, it becomes important to understand the added RES benefits that come from the services and amenities that facilitate real experiential interactions with environmental settings.

In terms of managerial implications, as events and other entertainment-oriented services become important parts of visitor engagement in botanic gardens (Viola & Speciale, 2021), managers need to monitor how these events contribute to their mission, to track their progress from year to year, to evaluate different event types, and to strategically plan their public engagement program in consideration of ecosystem service trade-offs. The Palermo Botanic Garden can use the TCM model of the Zagara to predict the effect of ticket price on visitation, measure the event's growth and strategically plan how to maximize its potential while respecting the botanic garden's mission. This might include planning events to optimize ecosystem services and the equitable distribution of their benefits. Garden managers understand that knowing their audience and reaching out to new visitors is important (Willison, 2013). Indeed, one of the Palermo University Botanic Garden's individual missions is that of “social caring” meant as “the strengthening of involvement and interaction with current and potential visitors and the transformation of the online community into a real community” (Schicchi & Gagliano Candela, 2021). However, like many non-profit and public institutions, the botanic garden lacks the human resources to carry out extensive economic and audience analyses (Hall & Shuck, 2021). The zonal TCM remains one of the most direct methods to evaluate the recreational use value of a site or amenity and profile its visitors. Indeed, some scholars have used the zonal TCM without conducting questionnaire surveys at all, but by relying on ticket sale information (Heldt & Mortazavi, 2016) or social media data (Sinclair et al., 2020). However, as the previously cited authors assert, better results are achieved when such studies are based on preliminary on-site investigations like the one carried out here.

The limitations of this study are related to its focus on a single edition of one event, the related use of the zonal TCM approach, and the unquantifiable impact of the COVID-19 pandemic. A single case study cannot show the differences between different kinds of events, and the bi-annual frequency of the Zagara does not lend itself to an individual TCM approach that can measure the influence of various visitor, site or event attributes. Furthermore, all TCM approaches are limited to measuring use value according to the revealed preferences of present and willing participants (Tempesta, 2018a). However, the social value of a public good is also made up of non-use values such as bequest, altruistic and existence values (TEEB, 2010). Despite these caveats, TCM valuation provides an important recreational use value reference based on real, rather than declared, behavior (Heldt & Mortazavi, 2016). Finally, it is currently impossible to say how strongly the pandemic has influenced the results in this investigation. This issue is best addressed by a systematic review of many case studies such as this one, or in comparison to a post-pandemic situation.

Future TCM studies could use this initial analysis and the cited literature herein as starting points to deepen understanding of botanic garden events by considering: alternative forms of data collection from social media (Sinclair et al., 2020) or ticket sale registration information (Heldt & Mortazavi, 2016); other visitor, site or event attributes in the regression analysis by applying the individual rather than zonal TCM to all garden events in a given time-frame (Brida et al., 2017; du Preez & Lee, 2016; Schilling et al., 2022; Yeh et al., 2016); or by adding contingent valuation (Mwebaze & Bennett, 2012; Tahzeeda et al., 2018; Yeh et al., 2018) or choice modelling sections (Affandi et al., 2020; Heldt & Mortazavi, 2016) to the questionnaire to further investigate visitor preferences for future development possibilities. The effect of the global pandemic is also a topic for future studies. As the critical phases of the pandemic pass, special events may emerge as important strategic responses to this and other crises thanks to their greater flexibility and their ability to generate concentrated economic returns (Towse, 2019). Furthermore, the pandemic may have increased consumers' preferences for outdoor, nature and wellness recreation (Puhakka, 2021).

Since its inauguration in 1795, the Palermo Botanic Garden's motto has been *miscuit utile dulci*, or combine what is useful with what is sweet, with this phrase taken from Horace's *Ars Poetica* painted above the historic lecture hall. While the pleasure to be derived from plants was meant to inspire university students when the garden was built, today this message is also meant for the masses. The botanic garden's ability to generate wellbeing is increasingly becoming central to its daily activities. Events like the Zagara deserve our attention, as they become one of the common means through which people engage directly with nature.

Back Matter

Funding

This work was supported by the Università degli Studi di Palermo's 35th cycle Ph.D. grant in Agricultural Food and Forest Sciences (D071).

Data Availability

Data can be requested via email to the corresponding author.

CRediT Authorship Contribution Statement

Cassandra Funsten: Conceptualization, Software, Formal analysis, Investigation, Data curation, Writing – original draft, Visualization. Caterina Di Franco: Methodology, Validation, Writing – review & editing. Valeria Borsellino: Investigation, Writing – review & editing. Natale Surano: Conceptualization, Resources. Antonio Asciuto: Methodology, Validation, Writing – review & editing. Emanuele Schimmenti: Methodology, Validation, Writing – review & editing, Supervision, Project administration.

Acknowledgements

The authors would like to thank the Palermo University Botanic Garden and the Palermo University SiMuA (*Sistema Museale di Ateneo*) for their help and support carrying out this research. They would also like to thank the editor and anonymous reviewers for their attentive reading of the work and insightful comments.

Chapter 6 References

Affandi, S. D., Halimatussadiah, A., & Asrofani, F. W. (2020). Visitors' preferences on the characteristics of Bogor Botanical Gardens. *Sustainability*, 12(22). https://doi.org/10.3390/su12229489

Ballantyne, R., Packer, J., & Hughes, K. (2008). Environmental awareness, interests and motives of botanic gardens visitors: Implications for interpretive practice. *Tourism Management*, 29(3), 439–444. https://doi.org/10.1016/J.TOURMAN.2007.05.006

Bedate, A., Herrero, L. C., & Sanz, J. Á. (2004). Economic valuation of the cultural heritage: Application to four case studies in Spain. *Journal of Cultural Heritage*, 5(1), 101–111. https://doi.org/10.1016/J.CULHER.2003.04.002

Benfield, R. (2001). "Good things come to those who wait": Sustainable tourism and timed entry at Sissinghurst Castle Garden, Kent. *Tourism Geographies*, 3(2), 207–217. https://doi.org/10.1080/14616680010030275

Benfield, R. (2013). *Garden tourism*. CAB International.

Benfield, R. (2021a). Events and festivals. In R. Benfield, *New directions in garden tourism* (pp. 98-115). CABI. https://doi.org/10.1079/9781789241761.0098

Benfield, R. (2021c). The effect of the coronavirus on garden tourism. In *New directions in garden tourism* (pp. 169-180). CABI. https://doi.org/10.1079/9781789241761.0012

BGCI (n.d.). About botanic gardens | Botanic Gardens Conservation International. Retrieved August 19, 2021, from https://www.bgci.org/about/about-botanic-garden/

BGCI (n.d.). GardenSearch/ Italy/ BGCI Members. Retrieved May 31, 2022, from https://tools.bgci.org/garden_search.php?action=Find&ftrCountry=IT&ftrKeyword=&ftrBGCImem=Y&x=96&y=11

Brida, J. G., Meleddu, M., & Tokarchuk, O. (2017). Use value of cultural events: The case of the Christmas markets. *Tourism Management*, 59, 67–75. https://doi.org/10.1016/J.TOURMAN.2016.07.012

Callaghan, C. T., Slater, M., Major, R. E., Morrison, M., Martin, J. M., & Kingsford, R. T. (2018). Travelling birds generate eco-travelers: The economic potential of vagrant birdwatching. *Human Dimensions of Wildlife*, 23(1), 71–82. https://doi.org/10.1080/10871209.2017.1392654

Catahan, N., & Woodruffe-Burton, H. (2019). The view, brew and loo: perceptions of botanic gardens? *Journal of Place Management and Development*, 12(1), 20–38. https://doi.org/10.1108/JPMD-12-2017-0127

Cheng, X., van Damme, S., Li, L., & Uyttenhove, P. (2019). Evaluation of cultural ecosystem services: A review of methods. *Ecosystem Services*, 37. https://doi.org/10.1016/j.ecoser.2019.100925

Clawson, M., & Knetsch, J. L. (1966). *Economics of outdoor recreation*. John Hopkins Press for Resources for the Future.

Clawson, M., & Knetsch, J. L. (2013). *Economics of outdoor recreation* (2nd ed., Vol. 3). RFF Press. https://doi.org/10.4324/9781315064215

Comune di Palermo (2018). Portale Open Data - Perimetrazione circoscrizioni comunali - Comune di Palermo. Retrieved August 23, 2021, from https://opendata.comune.palermo.it/opendata-dataset.php?dataset=265

Comune di Palermo (2020). Portale Open Data - Popolazione residente a Palermo al 31/12/2019 per circoscrizione e cittadinanza - Comune di Palermo. Retrieved August 23, 2021, from https://opendata.comune.palermo.it/opendata-dataset.php?dataset=1264

Connell, J. (2004). The purest of human pleasures: The characteristics and motivations of garden visitors in Great Britain. *Tourism Management*, 25(2), 229–247. https://doi.org/10.1016/j.tourman.2003.09.021

Daniels, J. M., Robbins, A. S. T., Brinkley, W. R., Wolf, K. L., & Chase, J. M. (2014). Toward estimating the value of stewardship volunteers: A cost-based valuation approach in King County, Washington, USA. *Urban Forestry & Urban Greening*, 13(2), 285–289. https://doi.org/10.1016/j.ufug.2014.01.004

Davies, C., & Sanesi, G. (2021, September 22). Special Issue on COVID-19. *Urban Forestry & Urban Greening*. https://www.sciencedirect.com/journal/urban-forestry-and-urban-greening/special-issue/1045ZMW7L0V

Dawson, E. (2014). Equity in informal science education: developing an access and equity framework for science museums and science centres. *Studies in Science Education*, 50(2), 209–247. https://doi.org/10.1080/03057267.2014.957558

Demir, A. (2014). Determination of the recreational value of botanic gardens. A case study Royal Botanic Gardens, Kew, London. *Revista de Cercetare Si Interventie Sociala*, 44, 160–180.

Du Preez, M., & Lee, D. E. (2016). The economic value of the Trans Baviaans mountain biking event in the Baviaanskloof Mega-Reserve, Eastern Cape, South Africa: A travel cost analysis using count data models. *Journal of Outdoor Recreation and Tourism*, 15, 47–54. https://doi.org/10.1016/J.JORT.2016.07.003

Garrod, G., Pickering, A., & Willis, K. (1993). The economic value of botanic gardens: A recreational perspective. *Geoforum*, 24(2), 215–224. https://doi.org/10.1016/0016-7185(93)90035-G

Haines-Young, R., & Potschin, M. (2018). Common International Classification of Ecosystem Services (CICES) V5.1, Guidance on the application of the revised structure. www.cices.eu

Hall, T., & Shuck, S. M. (2021). Estimating the economic impact of a one-time event: The case of l'Hermione in Yorktown. *Nonprofit Management and Leadership*, 31(4), 833–845. https://doi.org/10.1002/NML.21456

Heagney, E. C., Rose, J. M., Ardeshiri, A., & Kovač, M. (2018). Optimising recreation services from protected areas – Understanding the role of natural values, built infrastructure and contextual factors. *Ecosystem Services*, 31, 358–370. https://doi.org/10.1016/J.ECOSER.2017.10.007

Healy, R. G. (1994). The "common pool" problem in tourism landscapes. *Annals of Tourism Research*, 21(3), 596–611. https://doi.org/10.1016/0160-7383(94)90122-8

Heldt, T., & Mortazavi, R. (2016). Estimating and comparing demand for a music event using stated choice and actual visitor behaviour data. *Scandinavian Journal of Hospitality and Tourism*, 16(2), 130–142. https://doi.org/10.1080/15022250.2015.1117986

Hermes, J., van Berkel, D., Burkhard, B., Plieninger, T., Fagerholm, N., von Haaren, C., & Albert, C. (2018). Assessment and valuation of recreational ecosystem services of landscapes. *Ecosystem Services*, 31, 289–295. https://doi.org/10.1016/J.ECOSER.2018.04.011

Hodor, K., Przybylak, Ł., Kuśmierski, J., & Wilkosz-Mamcarczyk, M. (2021). Identification and analysis of problems in selected European historic gardens during the COVID-19 pandemic. *Sustainability*, 13(3), 1–18. https://doi.org/10.3390/su13031332

Hutcheson, W., Hoagland, P., & Jin, D. (2018). Valuing environmental education as a cultural ecosystem service at Hudson River Park. *Ecosystem Services*, 31, 387–394. https://doi.org/10.1016/J.ECOSER.2018.03.005

ISTAT (2020). Popolazione 15 anni e oltre per titolo di studio: Popolazione per titolo di studio e regioni. Retrieved July 12, 2021, from http://dati.istat.it/Index.aspx?QueryId=26176

ISTAT (2021a). Confini delle unità amministrative a fini statistici al 1° gennaio 2021. Retrieved August 23, 2021, from https://www.istat.it/it/archivio/222527

ISTAT (2021b). Popolazione residente al 1° gennaio: Tutti i comuni. Retrieved August 23, 2021, from http://dati.istat.it/Index.aspx?QueryId=19101#

Italian Ministry of Ecological Transition (2021, May 13). Monthly fuel prices - Energy and mining analysis and statistics - Ministry of Ecological Transition. Retrieved August 24, 2021, from https://dgsaie.mise.gov.it/prezzi_carburanti_mensili.php?lang=en_US

Italian Ministry of Health (2021, May 15). COVID-19, Nuova ordinanza del Ministro: Speranza per contenere la diffusione del virus. Retrieved August 25, 2021, from https://www.salute.gov.it/portale/nuovocoronavirus/dettaglioNotizieNuovoCoronavirus.jsp?lingua=italiano&menu=notizie&p=dalministero&id=5484

James, I., Hoffman, T., Munro, A., O'Farrell, P., & Smart, R. (2007). The economic value of flower tourism at the Namaqua National Park, South Africa. *South African Journal of Economic and Management Sciences (SAJEMS)*, 10(4), 442–456. https://doi.org/http://dx.doi.org/10.4102/sajems.v10i4.1058

Kulczyk, S., Woźniak, E., & Derek, M. (2018). Landscape, facilities and visitors: An integrated model of recreational ecosystem services. *Ecosystem Services*, 31, 491–501. https://doi.org/10.1016/J.ECOSER.2018.02.016

Lautenbach, S., Mupepele, A.-C., Dormann, C. F., Lee, H., Schmidt, S., Scholte, S. S. K., Seppelt, R., van Teeffelen, A. J. A., Verhagen, W., & Volk, M. (2019). Blind spots in ecosystem services research and challenges for implementation. *Regional Environmental Change*, 19(8). https://doi.org/10.1007/s10113-018-1457-9

Lebrun, A. M., Su, C. J., & Bouchet, P. (2021). Domestic tourists' experience in protected natural parks: A new trend in pandemic crisis? *Journal of Outdoor Recreation and Tourism*, 35, 100398. https://doi.org/10.1016/J.JORT.2021.100398

MA (2005). *Ecosystems and human well-being: Synthesis* (Millennium Ecosystem Assessment, Ed.). Island Press. Retrieved October 02, 2021, from https://www.millenniumassessment.org/documents/document.356.aspx.pdf

Mayer, M., & Woltering, M. (2018). Assessing and valuing the recreational ecosystem services of Germany's national parks using travel cost models. *Ecosystem Services*, 31, 371–386. https://doi.org/10.1016/J.ECOSER.2017.12.009

Moseley, D., Connolly, T., Sing, L., & Watts, K. (2018). Developing an indicator for the physical health benefits of recreation in woodlands. *Ecosystem Services*, 31, 420–432. https://doi.org/10.1016/J.ECOSER.2017.12.008

Mwebaze, P., & Bennett, J. (2012). Valuing Australian botanic collections: A combined travel-cost and contingent valuation study. *Australian Journal of Agricultural and Resource Economics*, 56(4). https://doi.org/10.1111/j.1467-8489.2012.00595.x

Orto Botanico (2022). Tariffe. Retrieved June 01, 2022, from http://ortobotanico.unipa.it/tariffe.html

OSM (n.d.-a). Map features - OpenStreetMap Wiki. Retrieved August 23, 2021, from https://wiki.openstreetmap.org/wiki/Map_features#Boundary

OSM (n.d.-b). Tile servers - OpenStreetMap Wiki. Retrieved August 23, 2021, from https://wiki.openstreetmap.org/wiki/Tile_servers

Paiva, P. D. de O., Sousa, R. De B., & Carcaud, N. (2020). Flowers and gardens on the context and tourism potential. *Ornamental Horticulture*, 26(1), 121–133. https://doi.org/10.1590/2447-536x.v26i1.2144

Piante Faro (2020). Catalogo piante Faro. Retrieved July 27, 2022, from https://www.piantefaro.com/wp-content/uploads/2021/02/Catalogo-PianteFaro-2020-21.pdf

Potschin, M., & Haines-Young, R. (2016). Defining and measuring ecosystem services. In M. Potschin, R. Haines-Young, R. Fish, & R. K. Turner (Eds.), *Routledge handbook of ecosystem eervices* (pp. 25–44). Routledge.

Potschin, M., Haines-Young, R., Fish, R., & Turner, R. K. (2016). Ecosystem services in the twenty-first century. In M. Potschin, R. Haines-Young, R. Fish, & R. K. Turner (Eds.), *Routledge handbook of ecosystem services* (pp. 1–9). Routledge.

Prayaga, P., Rolfe, J., & Sinden, J. (2006). A travel cost analysis of the value of special events: Gemfest in Central Queensland. *Tourism Economics*, 12(3), 403–420. https://doi.org/10.5367/000000006778493592

Puhakka, R. (2021). University students' participation in outdoor recreation and the perceived well-being effects of nature. *Journal of Outdoor Recreation and Tourism*, 36, 100425. https://doi.org/10.1016/J.JORT.2021.100425

Reeves, J. P., John, C. H. D., Wood, K. A., & Maund, P. R. (2021). A qualitative analysis of UK wetland visitor centres as a health resource. *International Journal of Environmental Research and Public Health. 18*(16), 8629. https://doi.org/10.3390/IJERPH18168629

Regione Siciliana, Assessorato del bilancio e delle finanze (2001). Circolare 23 maggio 2001, no. 4. Trattamento economico e giuridico delle missioni del personale. Adempimenti delle Ragionerie centrali. In *Gazzetta Ufficiale della Regione Siciliana* (Issue 35). Retrieved May 11, 2021, from http://www.gurs.regione.sicilia.it/Gazzette/g01-35-d.htm

Rigolon, A. (2016). A complex landscape of inequity in access to urban parks: A literature review. *Landscape and Urban Planning*, 153, 160–169. https://doi.org/10.1016/J.LANDURBPLAN.2016.05.017

Sanders, D. L., Ryken, A. E., & Stewart, K. (2018). Navigating nature, culture and education in contemporary botanic gardens. *Environmental Education Research*, 24(8), 1077–1084. https://doi.org/10.1080/13504622.2018.1477122

Scheaffer, R. L., Mendenhall, W. I., Ott, R. L., & Gerow, K. (2012). *Elementary survey sampling* (7th ed.). Brooks/Cole.

Schicchi, R., & Gagliano Candela, A. (2021). Structured interview, "Indagine sulla gestione dei giardini, parchi urbani e orti botanici storici siciliani relativa agli anni 2019 e 2020 - Orto Botanico dell'Università degli Studi di Palermo."

Schilling, H. T., Riley, I. J., Puckeridge, A. C., Milne-Muller, A., & Callaghan, C. T. (2022). Economic value of regional spearfishing competitions. *Fisheries Research*, 250. https://doi.org/10.1016/J.FISHRES.2022.106289

SEEA Experimental Ecosystem Accounting Technical Committee (2021). System of environmental-economic accounting — ecosystem accounting: Final draft version 5 February 2021. Retrieved May 23, 2022, from https://unstats.un.org/unsd/statcom/52nd-session/documents/BG-3f-SEEA-EA_Final_draft-E.pdf

Silva, S., & Carvalho, P. (2019). Visiting gardens in Portugal: Profiling the historic gardens visit and visitors. In *Tourism Innovation: Technology, Sustainability and Creativity* (pp. 127–147). Routledge. https://doi.org/10.4324/9780429022814-9

Sinclair, M., Mayer, M., Woltering, M., & Ghermandi, A. (2020). Valuing nature-based recreation using a crowdsourced travel cost method: A comparison to onsite survey data and value transfer. *Ecosystem Services*, 45, 101165. https://doi.org/10.1016/J.ECOSER.2020.101165

Società Botanica Italiana Onlus (SBI) (n.d.). Elenco degli orti botanici italiani | Orto Botanico d'Italia. Retrieved May 31, 2022, from http://www.ortobotanicoitalia.it/gli-orti-botanici/

Speciale, M. (2018). Le collezioni. In Sistema Museale di Ateneo (Ed.), *Orto Botanico - guida per il visitatore* (pp. 35–50). Palermo University Press.

Star, M., Rolfe, J., & Brown, J. (2020). From farm to fork: Is food tourism a sustainable form of economic development? *Economic Analysis and Policy*, 66, 325–334. https://doi.org/10.1016/J.EAP.2020.04.009

Surano, N. (2021). Personal communication on May 31, 2022. Zagara visitors.

Tahzeeda, J., Khan, M. R., & Bashar, R. (2018). Valuation approaches to ecosystem goods and services for the National Botanical Garden, Bangladesh. *Environmental and Socio-Economic Studies*, 6(1), 1–9. https://doi.org/10.2478/ENVIRON-2018-0001

TEEB (2010). Integrating the ecological and economic dimensions in biodiversity and ecosystem service valuation. In P. Kumar (Ed.), *The economics of ecosystems and biodiversity: The ecological and economic foundations* (pp. 3-40). Earthscan. http://www.teebweb.org/wp-content/uploads/2013/04/D0-Chapter-1-Integrating-the-ecological-and-economic-dimensions-in-biodiversity-and-ecosystem-service-valuation.pdf

Tempesta, T. (2018a). *Estimo ambientale*. CLEUP sc.

Towse, R. (2019). *A textbook of cultural economics*. (2nd ed.). Cambridge University Press.

Turner, K., Pearce, D., & Bateman, I. (1993). *Environmental economics: An elementary introduction*. The Johns Hopkins University Press.

Turpie, J., & Joubert, A. (2004). The value of flower tourism on the Bokkeveld Plateau - A botanical hotspot. *Development Southern Africa*, 21(4), 645–662. https://doi.org/10.1080/0376835042000288833

Ugolini, F., Massetti, L., Calaza-Martínez, P., Cariñanos, P., Dobbs, C., Ostoic, S. K., Marin, A. M., Pearlmutter, D., Saaroni, H., Šaulienė, I., Simoneti, M., Verlič, A., Vuletić, D., & Sanesi, G. (2020). Effects of the COVID-19 pandemic on the use and perceptions of urban green space: An international exploratory study. *Urban Forestry & Urban Greening*, 56, 126888. https://doi.org/10.1016/J.UFUG.2020.126888

UNIPA (2010). MOSTRA/"La Zagara" all'Orto botanico | Università degli Studi di Palermo. Retrieved August 19, 2021, from https://www.unipa.it/MOSTRA-La-Zagara-allOrto-botanico/

Van Berkel, D. B., Tabrizian, P., Dorning, M. A., Smart, L., Newcomb, D., Mehaffey, M., Neale, A., & Meentemeyer, R. K. (2018). Quantifying the visual-sensory landscape qualities that contribute to cultural ecosystem services using social media and LiDAR. *Ecosystem Services*, 31, 326–335. https://doi.org/10.1016/J.ECOSER.2018.03.022

Vergou, A., & Willison, J. (2016). Relating social inclusion and environmental issues in botanic gardens. *Environmental Education Research*, 22(1), 21–42. https://doi.org/10.1080/13504622.2014.984161

Viola, A., & Speciale, M. (2021). Palermo: il grande sperimentatore. In A. Viola & M. Speciale (Eds.), *Andare per orti botanici*. il Mulino.

WHO (2020, June 29). Listings of WHO's response to COVID-19. Retrieved June 10, 2021, from https://www.who.int/news/item/29-06-2020-covidtimeline

Willison, J. (2013). First word: Our audience keeps us real and relevant. *Roots - Botanic Gardens Conservation International Education Review*, 10(2), 2–5. https://www.bgci.org/wp/wp-content/uploads/2019/04/Roots_10.2.pdf

Yeh, C. C., Hua, K. T., & Huang, C. H. (2016). Service quality improving effects and recreational benefits for sports tourism - a case study. *Tourism Economics*, 22(6), 1332–1337. https://doi.org/10.1177/1354816616672357

Yeh, C. C., Lin, C. S., & Huang, C. H. (2018). The total economic value of sport tourism in belt and road development-an environmental perspective. *Sustainability*, 10(4). https://doi.org/10.3390/SU10041191

Chapter 7 - Conclusions

7.1 Objectives, Results, and Implications

The interconnection between historic gardens and people, including their social, political and economic systems, is an untapped area of study with important implications for the conservation of these living heritage sites as well as for human wellbeing and quality of life.

This dissertation aimed to investigate historic garden management and fruition with a people-centered approach by focusing on how historic gardens are influenced by social, political and economic dynamics. These themes are both missing from existing literature (Funsten et al., 2020) and relevant to new trends in historic garden conservation and fruition made even more evident by the COVID-19 pandemic (Hodor et al., 2021).

To carry out these aims, the dissertation applied various research methodologies that have to do with the study of human beings and their relationship with their environment. Each of its investigations used qualitative, spatial or quantitative data in a mixed-method approach that allowed the complex research problem of historic garden management and fruition to be seen from different perspectives and with different focuses.

Some of the investigations conducted as part of the dissertation used the city of Palermo (Italy) as a case study to analyze the problems affecting historic garden management and fruition. Palermo has been celebrated throughout history as a paradise full of magnificent gardens (Barbera, 2012; Pirajno et al., 2015; Pirrone et al., 1989), but today its citizens are deeply dissatisfied with both their city and with its parks and gardens (European Union, 2013). Palermo's abundance of historic parks and gardens along with their recognized degradation makes it an ideal laboratory for investigating how such internationally relevant issues as economic and health crises, public austerity, bureaucracy and sustainable development initiatives all impact historic gardens and their ability to provide social benefits. Each of the investigations within this work informed the next in an iterative process of knowledge seeking.

Qualitative interviews conducted with historic garden caretakers revealed that social, political and economic issues were foremost in their thoughts as they struggled to manage their sites and make them accessible to visitors. These interviews also revealed how historic gardens became important social gathering places during the COVID-19 pandemic. The interview participants' concern for public welfare, frustration with inefficient political systems and search for ways to engage the public all continued to be guiding threads in the successive investigations presented in the dissertation.

However, a systematic literature review demonstrated that these issues of social, political and economic sustainability were not the focus of pre-pandemic scientific investigations. When the review was conducted in 2020, most historic garden management studies focused on the identification and listing of historic gardens by trained experts, but not on the social, political or economic context in which that activity took place. One reason for this is that they based their research on the Florence Charter (ICOMOS-IFLA, 1982), an over forty-year-old guiding document whose main objective was the preservation of living monuments rather than the management of cultural landscapes. The authors of the reviewed literature also unequivocally criticized national, regional and municipal planning policy for not effectively recognizing and conserving historic gardens.

In response to both the interviews and the literature review, the next investigations delved into the political issues affecting the research argument. A content analysis of international guiding documents and legislation looked beyond the commonly cited Florence Charter, to see where historic gardens fit within the wider framework of 20th to early 21st century heritage policy. This analysis revealed important trends, including an evolution from a monument-centered approach to a landscape approach, exemplified by the European Landscape Convention (2000). A comparison of the Florence Charter's recommendations with the administrative and

legislative measures in force at national, regional and local levels of government identified many dysfunctionalities at each governance level, imputable to poor communication and coordination between government entities. An examination of Italy's recent National Recovery and Resilience Plan (NRRP) investment program for historic parks and gardens showed how Italian and European policy is turning from monument centered or landscape centered heritage policy to sustainability centered heritage policy, driven by the United Nations 2030 Agenda for Sustainable Development (United Nations, 2015b) and specifically sustainable development goal 11.4 (United Nations, 2015) which prioritizes the social benefits that heritage provides. Finally, the efficiency of heritage lists as policy instruments was investigated using spatial analysis and ecosystem service modelling tools to examine those in force in Palermo. These policy instruments meant to identify, protect and promote historic gardens were found to be generally outdated and irrelevant to recreational users. They present an opportunity to provide recreational ecosystem services to important user groups but need to be reevaluated in terms of their purpose, cataloguing procedures and promotion. For this to happen, heritage listing needs to address heritage policy's turn towards sustainability and be better connected to the heritage management aspects of upkeep, visitor accessibility and public engagement.

In fact, the last investigation focused precisely on the value of public engagement activities in historic gardens. Specifically, the investigation used the zonal travel cost method to assess the recreational ecosystem services generated through the human input of an event in the Palermo University Botanical Garden in Spring 2021. The investigation estimated the monetary value of the event's contribution to human wellbeing through recreation, which provided an important first benchmark for Sicily for future investigations of the recreational value of an event and contributed to a small but growing body of literature investigating the effect of human inputs on ecosystem service benefits. This is particularly pertinent to cultural ecosystem services because their benefits are understood as the experiences or capabilities gained from an environmental setting (Haines-Young & Potschin, 2018).

In its entirety, this dissertation provided a new perspective on the management and fruition of historic gardens. By considering the social, political and economic contexts in which they exist, it identified developments in natural and cultural heritage policy that have important implications for historic garden management and fruition. Post-COVID-19 policies, such as Italy's NRRP, see heritage as something to be managed for sustainable development, rather than preserved in an unchanging state. As a result, more emphasis is being put on the experiences heritage provides and on the stakeholders it involves. With this perspective, public engagement initiatives organized in historic gardens, but also in other natural and cultural heritage sites, become increasingly important thanks to their perceived ability to involve the community, create meaningful experiences and generate income.

7.2 Limitations

This dissertation focused on the social, political and economic factors influencing historic garden management and fruition. Thus, a clear limit to the study is that it did not address other environmental factors such as climate change or biodiversity. It only looked at the recreational ecosystem services provided by historic gardens, but not their contributions to other cultural ecosystem services, supporting services, provisioning services, or regulating services. These aspects of historic gardens' importance are covered by many of the authors cited in this work, especially those addressing the environmental importance of urban green spaces and green infrastructure. Thus, a conscious choice was made to focus on the significant gap in the literature regarding the people involved in historic garden management and fruition.

Investigating a research area with little existing literature entails spending more time on building a theoretical framework and on elaborating basic data sets. This became even more true in the case-study context of Palermo, where there is little public or published data on historic garden management and where it is not common practice for historic gardens to release annual reports or conduct regular marketing investigations, like those used by other authors investigating historic garden management elsewhere (Benfield, 2013; Silva & Carvalho, 2019).

The COVID-19 pandemic also posed a significant limit in the study. It not only affected the carrying out of the investigations themselves but also affected many of the results. The interviews and surveys were conducted in an extraordinary context, and thus cannot be considered part of pre-existing trends. Many of the results in this study indicated that the last few years have been a watershed moment for historic gardens, and that the COVID-19 pandemic may have significantly changed both management and fruition practices. Without a few years of perspective this cannot be ascertained for certain.

However, these limits are all double sided, with each one also presenting interesting opportunities. Looking at a less studied subject and geographic area from a new point of view was also an opportunity to explore and propose new discourses. Conducting research during the COVID-19 pandemic provided a front-row seat during a fascinating historical event and natural experiment. Using different methodologies allowed the research topic of historic garden management to be seen in a holistic multi-faceted way, with the various social, political and economic threads weaving together into an interesting and coherent tapestry.

7.3 Future Directions

The dissertation opened many interesting issues for future enquiry, including the role of citizens in caring for public green spaces, the need for legal frameworks that are more flexible and adaptive to change, and a reconsideration in both policy and practice of what (and who) heritage is for. Recent historic garden policy, such as Italy's NRRP measure for historic parks and gardens, seems to encourage citizen involvement in the identification, care and management of historic gardens and seems to value fruition at least as much as preservation. However, the preliminary interviews conducted in this dissertation showed that the third-sector management of historic gardens is quite difficult and precarious. None of the participating associations could keep a real ornamental garden; they effectively opened their sites as lower maintenance parkland. Can this kind of management model maintain the artistic, historic and biological value of a historic garden or does favoring fruition sacrifice other values at the expense of recreational needs? The possibilities and problems offered by third sector and private run parks is increasingly pertinent. Access to urban green spaces is often not equitable (Rigolon, 2016) and government austerity may be driving a turn towards more public-private and fully privatized park and garden management models (Arena, 2015; Milbourne, 2021).

This dissertation also suggested the pursuit of new mixed-method approaches that combine larger scale big data sources with in-person site-specific studies. Cross validation is an important aspect of mixed method research (Bryman, 2016), and recent investigations using crowdsourced (Sinclair et al., 2020) and remote sensing (Wales et al., 2020) data with on-site surveys and interviews have found that the combination increases scope and relevance.

Finally, this study focused on recreational ecosystem services because they are the principal way in which cultural ecosystem services are quantified in research and policy (Hermes et al., 2018). However, other forms of experiential cultural ecosystem services, such as educational ecosystem services, could take advantage of the same methods applied here (Hutcheson et al., 2018). Much of the literature quantifying the psychological and physical health benefits of urban nature has been carried out by evaluating students or hospital patients (Huynh et al.,

2022; Pinto et al., 2022; Puhakka, 2021), providing a good background for future economic assessments of investments made in these areas.

As policy focuses more on the wellbeing benefits of green spaces (European Commission, 2022b), it is important to evaluate how effective those measures are. Furthermore, the burdens of educational and health costs are significant for both single individuals and society. Investigating how investments in historic gardens, along with other multifunctional forms of urban nature, can reduce this burden is an important line of enquiry that could bring benefits to both the green spaces and their visitors (Claessens et al., 2014). These suggestions are in line the World Health Organization's recommendations that green space projects be considered social and public health investments and that policy-makers and practitioners use local data to guide equitable planning (WHO Regional Office for Europe, 2017a), and that interventions are most effective when a "dual approach" is used coupling social engagement/participation with a physical interventions (WHO Regional Office for Europe, 2017b).

Chapter 7 References

Arena, G. (2015). I beni comuni nell'età della condivisione. In G. Arena & C. Iaione (Eds.), *L'età della condivisione. La collaborazione fra cittadini e amministrazione per i beni comuni* (pp. 15–30). Carocci.

Bryman, A. (2016). *Social research methods* (5th Edition). Oxford University Press.

Claessens, J., Schram-Bijkerk, D., Dirven-van Breemen, L., Otte, P., & van Wijnen, H. (2014). The soil-water system as basis for a climate proof and healthy urban environment: Opportunities identified in a Dutch case-study. *Science of the Total Environment*, *485–486*(1), 776–784. https://doi.org/10.1016/J.SCITOTENV.2014.02.120

European Commission (2022b). *Environmental Impact Assessment: Evaluating the effects of public and provate projects on the environment*. https://environment.ec.europa.eu/law-and-governance/environmental-assessments/environmental-impact-assessment_en

European Landscape Convention (2000). European Treaty Series no. 176. https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=0900001680080621

Haines-Young, R., & Potschin, M. (2018). Common International Classification of Ecosystem Services (CICES), V5.1 Guidance on the application of the revised structure. www.cices.eu

Hermes, J., van Berkel, D., Burkhard, B., Plieninger, T., Fagerholm, N., von Haaren, C., & Albert, C. (2018). Assessment and valuation of recreational ecosystem services of landscapes. *Ecosystem Services*, *31*, 289–295. https://doi.org/10.1016/J.ECOSER.2018.04.011

Hutcheson, W., Hoagland, P., & Jin, D. (2018). Valuing environmental education as a cultural ecosystem service at Hudson River Park. *Ecosystem Services*, *31*, 387–394. https://doi.org/10.1016/J.ECOSER.2018.03.005

Huynh, L. T. M., Gasparatos, A., Su, J., Lam, R. D., Grant, E. I., & Fukushi, K. (2022). Linking the nonmaterial dimensions of human-nature relations and human well-being through cultural ecosystem services. *Science Advances*, *8*(31), 8042. https://doi.org/10.1126/SCIADV.ABN8042/SUPPL_FILE/SCIADV.ABN8042_DATASET.ZIP

ICOMOS-IFLA (1982). Historic Gardens (The Florence Charter). https://www.icomos.org/images/DOCUMENTS/Charters/gardens_e.pdf

Milbourne, P. (2021). Growing public spaces in the city: Community gardening and the making of new urban environments of publicness. *Urban Studies*, *58*(14), 2901–2919. https://doi.org/10.1177/0042098020972281

Pinto, L. V., Inácio, M., Ferreira, C. S. S., Ferreira, A. D., & Pereira, P. (2022). Ecosystem services and well-being dimensions related to urban green spaces – A systematic review. *Sustainable Cities and Society*, *85*. https://doi.org/10.1016/J.SCS.2022.104072

Puhakka, R. (2021). University students' participation in outdoor recreation and the perceived well-being effects of nature. *Journal of Outdoor Recreation and Tourism*, *36*, 100425. https://doi.org/10.1016/J.JORT.2021.100425

Rigolon, A. (2016). A complex landscape of inequity in access to urban parks: A literature review. *Landscape and Urban Planning*, *153*, 160–169. https://doi.org/10.1016/J.LANDURBPLAN.2016.05.017

Sinclair, M., Mayer, M., Woltering, M., & Ghermandi, A. (2020). Valuing nature-based recreation using a crowdsourced travel cost method: A comparison to onsite survey data and value transfer. *Ecosystem Services*, *45*, 101165. https://doi.org/10.1016/J.ECOSER.2020.101165

United Nations (2015b). Transforming our world: the 2030 Agenda for Sustainable Development. In *Resolution adopted by the General Assembly* (pp. 1–35). General Assembly. https://documents-dds-ny.un.org/doc/UNDOC/GEN/N15/291/89/PDF/N1529189.pdf?OpenElement

Wales, N., Murphy, R. J., & Bruce, E. (2020). Understanding patterns of vegetation change at the Angkor World Heritage site by combining remote sensing results with local knowledge. *International Journal of Remote Sensing, 42:2, 445-468*. https://doi.org/10.1080/01431161.2020.1809739

References

Abdel-Rahman, N. H. (2016). Egyptian historical parks, authenticity vs. change in Cairo's cultural landscapes. *Procedia - Social and Behavioral Sciences*, *225*, 391–409. https://doi.org/10.1016/j.sbspro.2016.06.086

Accati, E., & Devecchi, M. (2005). Il restauro del giardino storico. *Italus Hortus*, *12*(4), 17–30. http://www.italushortus.it/phocadownload/review/review_2/02.accati.pdf

Affandi, S. D., Halimatussadiah, A., & Asrofani, F. W. (2020). Visitors' preferences on the characteristics of Bogor Botanical Gardens. *Sustainability*, *12*(22). https://doi.org/10.3390/su12229489

Agenzia delle Entrate (2022). *Cartografia catastale WMS* (Issue 1.3.0). https://wms.cartografia.agenziaentrate.gov.it/inspire/wms/ows01.php

Albericci, R. (2006). Issues relating to the technical management, the lack of specific skills and the professional training of staff working in botanic gardens and historic parks. *Informatore Botanico Italiano (Atti "Giardino Storico e Orto Botanico: Un bene culturale al servizio della comunità", Erba 11-12/03/2005)*, *38*(1), 298–300.

Aldwaik, S. Z., & Pontius, R. G. (2012). Intensity analysis to unify measurements of size and stationarity of land changes by interval, category, and transition. *Landscape and Urban Planning*, *106*(1), 103–114. https://doi.org/10.1016/J.LANDURBPLAN.2012.02.010

Alonso-Jiménez, R. F., Loren-Méndez, M., Pinzón-Ayala, D., Ollero-Lobato, F., Reinoso-Gordo, F., Gámiz-Gordo, A., José, A., & Pontes, G.-B. (2021). Heritage cataloguing in history: Conceptual and graphical foundations of immovable cultural heritage data bases in the case of Spain. *Sustainability*, 13:19, 11043. https://doi.org/10.3390/SU131911043

Alves, M., Vaz, C., Gomes, A., & Virtuoso, F. (2019). Restoration of the masonry arch bridge over Jamor River in the national palace of Queluz. In R. Aguilar, D. Torrealva, S. Moreira, M. A. Pando, & L. F. Ramos (Eds.), *Structural analysis of historical constructions* (Vol. 18, pp. 2483–2491). Springer International Publishing. https://doi.org/10.1007/978-3-319-99441-3_267

Anderson, L. M., & Cordell, H. K. (1988). Influence of trees on residential property values in Athens, Georgia (U.S.A.): A survey based on actual sales prices. *Landscape and Urban Planning*, *15*(1–2), 153–164. https://doi.org/10.1016/0169-2046(88)90023-0

Arena, G. (2015). I beni comuni nell'età della condivisione. In G. Arena & C. Iaione (Eds.), *L'età della condivisione. La collaborazione fra cittadini e amministrazione per i beni comuni* (pp. 15–30). Carocci.

Arteaga, A., Malumbres-Olarte, J., Gabriel, R., Ros-Prieto, A., Casimiro, P., Sanchez, A., Albergaria, I., & Borges, P. (2020). Arthropod diversity in two historic gardens in the Azores, Portugal. *Biodiversity Data Journal, 8*, e54749. https://doi.org/10.3897/BDJ.8.e54749

Asciuto, A., Borsellino, V., D'Acquisto, M., di Franco, C. P., di Gesaro, M., & Schimmenti, E. (2015). Monumental trees and their existence value: The case study of an Italian natural park. *Journal of Forest Science, 61*(2), 55–61. https://doi.org/10.17221/86/2014-JFS

Asciuto, A., Fiandaca, F., & Schimmenti, E. (2004). Stima della disponibilità a pagare per la salvaguardia di un'area protetta siciliana dagli incendi boschivi. *Aestimum*. https://doi.org/10.13128/AESTIMUM-6624

Askwith, C. (2009). The economic contribution of historic parks, gardens and designed landscapes: A review of existing data and research and recommendations for future research. *Cultural Trends, 9:35, 27-79*. https://doi.org/10.1080/09548969909365088

Assessorato del Territorio e dell'Ambiente (1993). *Norme di attuazione del Piano Particolareggiato Esecutivo*. Comune di Palermo. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_11062014123739.pdf

Atkinson, G., & Mourato, S. (2015). *Cost-benefit analysis and the environment* (No. 97; OECD Environment Working Papers). https://doi.org/10.1787/5jrp6w76tstg-en

Australia ICOMOS (2013). *The Burra Charter: The Australia ICOMOS Charter for places of cultural significance, 2013*. http://openarchive.icomos.org/id/eprint/2145/

Australia/ICOMOS (1979). *Burra Charter 1979*. https://australia.icomos.org/wp-content/uploads/Burra-Charter_1979.pdf

Balding, M., & Williams, K. J. H. (2016). Plant blindness and the implications for plant conservation. *Conservation Biology*, *30*(6), 1192–1199. https://doi.org/https://doi.org/10.1111/cobi.12738

Ballantyne, R., Packer, J., & Hughes, K. (2008). Environmental awareness, interests and motives of botanic gardens visitors: Implications for interpretive practice. *Tourism Management*, *29*(3), 439–444. https://doi.org/10.1016/J.TOURMAN.2007.05.006

Bandarin, F., & Oers, R. Van. (2012). *The historic urban landscape: Managing heritage in an urban century*. Wiley Blackwell.

Barbera, G. (2012). *Conca d'Ora*. Sellerio editore Palermo.

Barbera, G., & Speciale, M. (2015). *Meraviglie botaniche, giardini e parchi di Palermo*. Assessorato dei beni culturali e dell'identità siciliana.

Bardeschi, M. D. (2009). Salviamo il patrimonio del passato, ma i nuovi giardini del terzo millennio dove sono? In L. S. Pelissetti & L. Scazzosi (Eds.), *Giardini Storici, a 25 anni dalle Carte di Firenze: esperienze e prospettive*. Leo S. Olschki.

Basnou, C., Pino, J., & Terradas, J. (2015). Ecosystem services provided by green infrastructure in the urban environment. *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*, *10*. https://doi.org/10.1079/PAVSNNR201510004

Bedate, A., Herrero, L. C., & Sanz, J. Á. (2004). Economic valuation of the cultural heritage: Application to four case studies in Spain. *Journal of Cultural Heritage*, *5*(1), 101–111. https://doi.org/10.1016/J.CULHER.2003.04.002

Benfield, R. (2001). "Good things come to those who wait": Sustainable tourism and timed entry at Sissinghurst Castle Garden, Kent. *Tourism Geographies*, *3*(2), 207–217. https://doi.org/10.1080/14616680010030275

Benfield, R. (2013). *Garden tourism*. CAB International.

Benfield, R. (2021a). Events and festivals. In R. Benfield, *New directions in garden tourism* (pp. 98-115). CABI. https://doi.org/10.1079/9781789241761.0098

Benfield, R. (2021b). Impacts of botanic gardens: Economic, social, environmental, and health. In *New directions in garden tourism* (pp. 116–129). CABI. https://doi.org/10.1079/9781789241761.0008

Benfield, R. (2021c). The effect of the coronavirus on garden tourism. In *New directions in garden tourism* (pp. 169-180). CABI. https://doi.org/10.1079/9781789241761.0012

Bergande, B., & Marstein, B. (2013). A preservation and management plan for the Botanic Garden Berlin-Dahlem. *Englera*, *30*, 145–162. http://www.jstor.org/stable/24365190

Bern Convention on the Conservation of European Wildlife and Habitats (1979). European Treaty Series no. 104. https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=104

Bernetti, I., Sottini, V. A., Marinelli, N., Marone, E., Menghini, S., Riccioli, F., Sacchelli, S., & Marinelli, A. (2013). Quantification of the total economic value of forest systems: Spatial analysis application to the region of Tuscany (Italy). *Aestimum*, 29–65. https://doi.org/10.13128/AESTIMUM-13191

BGCI (2019). *About botanic gardens*. Botanical Gardens Conservation International Website. https://www.bgci.org/about/about-botanic-garden/

BGCI (2022). *GardenSearch/ Italy/ BGCI Members*. Botanic Gardens Conservation International Website. https://tools.bgci.org/garden_search.php?action=Find&ftrCountry=IT&ftrKeyword=&ftrBGCImem=Y&x=96&y=11

Birnbaum, Charles. A., & Madigan, K. J. (1996). *The Secretary of the Interior's standards for the treatment of historic properties: With guidelines for the treatment of cultural landscapes* (C. Capella Peters, Ed.). U.S. Department of Interior, National Park Service, Cultural Resource Stewardship and Partnerships, Heritage Preservation Services, Historic Landscape Initiative (Project).

Blaschke, T., Merschdorf, H., Cabrera-Barona, P., Gao, S., Papadakis, E., & Kovacs-Györi, A. (2018). Place versus space: From points, lines and polygons in GIS to place-based representations reflecting language and culture. *ISPRS International Journal of Geo-Information 2018, Vol. 7, Page 452*, *7*(11), 452. https://doi.org/10.3390/IJGI7110452

Boisset, C. M. (1980). The Don Wells memorial essay, 1979: Management of historic gardens—their role in the present and the future as public amenity areas. *Arboricultural Journal*, *4*(1), 34–40. https://doi.org/10.1080/03071375.1980.10590587

Brandt, A., & Rohde, M. (2007). Sustainable marketing for historic gardens. *Garden History*, *35*(2), 131–145. https://www.jstor.org/stable/40219923

Brida, J. G., Meleddu, M., & Tokarchuk, O. (2017). Use value of cultural events: The case of the Christmas markets. *Tourism Management*, *59*, 67–75. https://doi.org/10.1016/J.TOURMAN.2016.07.012

Brine, A., & Feather, J. (2010). The information needs of UK historic houses: Mapping the ground. *Journal of Documentation*, *66*(1), 28–45. https://doi.org/10.1108/00220411011016353

Bryman, A. (2016). *Social research methods* (5th Edition). Oxford University Press.

Burford, G., Hoover, E., Velasco, I., Janoušková, S., Jimenez, A., Piggot, G., Podger, D., & Harder, M. K. (2013). Bringing the "missing pillar" into Sustainable Development Goals: Towards intersubjective values-based indicators. *Sustainability, 5*(7), 3035–3059. https://doi.org/10.3390/SU5073035

Burmil, S. (2000). Issues in the conservation of gardens in israel: Ramat hanadiv as a case study. *Studies in the History of Gardens and Designed Landscapes*, *20*(1), 57–68. https://doi.org/10.1080/14601176.2000.10435608

Callaghan, C. T., Slater, M., Major, R. E., Morrison, M., Martin, J. M., & Kingsford, R. T. (2018). Travelling birds generate eco-travellers: The economic potential of vagrant birdwatching. *Human Dimensions of Wildlife*, *23*(1), 71–82. https://doi.org/10.1080/10871209.2017.1392654

Canestrini, F., Capuano, A., Galletti, G., Guarino, C., Pizzoni, F., Rallo, G., Rallo Coordinamento, G., Cazzato, V., Colleoni, A., Damiani, G., Fiorentino, G., Marziano, M., Paglialunga, L., & Riccio, E. (2021). *Linee guida e norme tecniche per il restauro dei giardini storici*. https://media.beniculturali.it/mibac/files/boards/be78e33bc8ca0c99bff70aa174035096/P

DF/2022/LINEE%20GUIDA%20E%20NORME%20TECNICHE%20PER%20IL%20RESTAURO%20DEI%20GIARDINI%20STORICI.pdf

Cappelletti, E. M. (2006). A historical botanic garden, UNESCO World cultural heritage: Opportunities and problems. *Informatore Botanico Italiano (Atti "Giardino Storico e Orto Botanico: Un bene culturale al servizio della comunità", Erba 11-12/03/2005)*, *38*(1), 278–284.

Catahan, N., & Woodruffe-Burton, H. (2019). The view, brew and loo: Perceptions of botanic gardens? *Journal of Place Management and Development*, *12*(1), 20–38. https://doi.org/10.1108/JPMD-12-2017-0127

Cavagnero, P., & Revelli, R. (2009). Numerical model application for the restoration of the Racconigi Royal Park (CN, Italy). *Journal of Cultural Heritage*, *10*(4), 514–519. https://doi.org/10.1016/j.culher.2009.01.004

Cazzani, A., Zerbi, C. M., & Brumana, R. (2019). *Management plans and web-GIS software applications as active and dynamic tools to conserve and valorize historic public gardens*. *42*, 291–298. https://doi.org/10.5194/isprs-archives-XLII-2-W15-291-2019

Chadwick, G. F. (1966). *The park and the town public landscape in the 19th and 20th centuries* (F. A. Praeger, Ed.). Architectural Press.

Chan, K. M. A., Satterfield, T., & Goldstein, J. (2012). Rethinking ecosystem services to better address and navigate cultural values. *Ecological Economics*, *74*, 8–18. https://doi.org/10.1016/J.ECOLECON.2011.11.011

Cheng, X., van Damme, S., Li, L., & Uyttenhove, P. (2019). Evaluation of cultural ecosystem services: A review of methods. *Ecosystem Services*, *37*. https://doi.org/10.1016/j.ecoser.2019.100925

Ciaffi, M., Alicandri, E., Vettraino, A. M., Paolacci, A. R., Tamantini, M., Tomao, A., Agrimi, M., & Kuzminsky, E. (2018). Conservation of veteran trees within historical gardens (COVE): A case study applied to *Platanus orientalis* L. in central Italy. *Urban Forestry & Urban Greening*, *34*, 336–347. https://doi.org/10.1016/J.UFUG.2018.07.022

Città di Palermo - Settore Ambiente e Territorio (2008). *Regolamento del Verde Pubblico e Privato*. https://www.comune.palermo.it/js/server/uploads/regolamenti/_05032019104609.pdf

Città di Palermo Settore Urbanistica (2004a). *Elenco Verde Storico adeguati ai D.Dir. 558 e 124/DRU/02 di approvazione*. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_09012014121349.pdf

Città di Palermo Settore Urbanistica (2004b). *Norme Tecniche di Attuazione, adeguate alla errata corrige*. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_20122013095758.pdf

Città di Palermo Settore Urbanistica (2004c). *Variante Generale al P.R.G., Relazione Generale*. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_14052014162916.pdf

Claessens, J., Schram-Bijkerk, D., Dirven-van Breemen, L., Otte, P., & Van Wijnen, H. (2014). The soil-water system as basis for a climate proof and healthy urban environment: Opportunities identified in a Dutch case-study. *Science of the Total Environment*, *485–486*(1), 776–784. https://doi.org/10.1016/J.SCITOTENV.2014.02.120

Claval, P. (1989). L'étude géographique des parcs et des jardins (A geographical approach of parks and gardens). *Bulletin de l'Association de Géographes Français*, *66*(3), 167–175. https://doi.org/10.3406/bagf.1989.1477

Clawson, M., & Knetsch, J. L. (1966). *Economics of outdoor recreation*. John Hopkins Press for Resources for the Future.

Clawson, M., & Knetsch, J. L. (2013). *Economics of outdoor recreation* (2nd ed., Vol. 3). RFF Press. https://doi.org/10.4324/9781315064215

Codice dei beni culturali e del paesaggio (2004). Decreto legislativo no. 42 and successive modifications, *Gazzetta Ufficiale della Repubblica Italiana* n.45 del 24-02-2004 - Suppl. Ordinario no. 28. https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2004-01-22;42

Codice del Terzo settore (2017). Decreto legislativo no. 117, *Gazzetta Ufficiale della Repubblica Italiana* no. 179 02/08/2017, suppl. Ordinario no. 43. https://www.normattiva.it/atto/caricaDettaglioAtto?atto.dataPubblicazioneGazzetta=2017-08-02&atto.codiceRedazionale=17G00128&tipoDettaglio=multivigenza&qId=&tabID=0.0594494557249225 5&title=Atto%20multivigente&bloccoAggiornamentoBreadCrumb=true

Cole, G. A. (2004). *Management theory and practice*. Cengage Learning EMEA.

Collins, J. (2020). *The architecture and landscape of health: A historical perspective on therapeutic places 1790-1940*. Routledge.

Commission Notice C/2021/1054, (2021). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021XC0218(01)

Comune di Palermo (2022). *Art. 10 bis del Regolamento del Verde Pubblico e Privato, approvato con deliberazione del Consiglio Comunale no. 355 del 16.10.2008*. https://www.comune.palermo.it/js/server/uploads/_22092022093749.pdf

Comune di Palermo, & Assessorato all'Urbanistica e Centro Storico (1989a). La tipologia edilizia storica. In *Piano Particolareggiato Esecutivo Centro Storico: Vol. Tav. 9*. Comune di Palermo. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_12062014110839.pdf

Comune di Palermo, & Assessorato all'Urbanistica e Centro Storico (1989b). La tipologia edilizia storica - legenda. In *Piano Particolareggiato Esecutivo, Tav. 9*. https://www.comune.palermo.it/js/server/uploads/trasparenza_all/_12062014110659.pdf

Connell, J. (2004). The purest of human pleasures: The characteristics and motivations of garden visitors in Great Britain. *Tourism Management*, *25*(2), 229–247. https://doi.org/10.1016/j.tourman.2003.09.021

Connell, J. (2005). Managing gardens for visitors in Great Britain: A story of continuity and change. *Tourism Management*, *26*(2), 185–201. https://doi.org/10.1016/j.tourman.2003.10.002

Conway, H. (2014). Public parks and their conservation. In M. Harney (Ed.), *Gardens & landscapes in historic building conservation* (pp. 193–205). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.CH19

Coombes, M. A., & Viles, H. A. (2021). Integrating nature-based solutions and the conservation of urban built heritage: Challenges, opportunities, and prospects. *Urban Forestry and Urban Greening*, *63*. https://doi.org/10.1016/J.UFUG.2021.127192

Costituzione della Repubblica Italiana, art. 9 (1948). *Gazzetta Ufficiale della Repubblica Italiana* Serie Generale no. 298 27/12/1947. https://www.gazzettaufficiale.it/dettaglio/codici/costituzione

Couclelis, H. (2009). The abduction of geographic information science: Transporting spatial reasoning to the realm of purpose and design. In *Lecture Notes in Computer Science*

(including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics): Vol. 5756 LNCS (pp. 342–356). Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-03832-7_21/COVER/

Council of Europe (2021). Chart of Signatures and ratifications of Treaty 176 - European Landscape Convention. https://www.coe.int/en/web/conventions/full-list

Counsell, J. (2001). An evolutionary approach to digital recording and information about heritage sites. *Proceedings of the 2001 Conference on Virtual Reality, Archeology, and Cultural Heritage - VAST '01*, 33. https://doi.org/10.1145/584993.584999

Cranz, G., & Boland, M. (2004). Defining the sustainable park: A fifth model for urban parks. *Landscape Journal*, *23*(2), 102–120.

Cricd (2021). Schede PG. In *full .html files of historic park and garden listings*. Centro Regionale per l'inventario, la catalogazione e la documentazione dei beni culturali della Regione Siciliana.

CRicd (2022). *Catalogo Beni Culturali della Regione Siciliana*. https://catalogobeni.cricd.it

Daniels, J. M., Robbins, A. S. T., Brinkley, W. R., Wolf, K. L., & Chase, J. M. (2014). Toward estimating the value of stewardship volunteers: A cost-based valuation approach in King County, Washington, USA. *Urban Forestry & Urban Greening*, *13*(2), 285–289. https://doi.org/10.1016/j.ufug.2014.01.004

Davies, C., & Sanesi, G. (2021, September 22). *Special issue on COVID-19*. Urban Forestry & Urban Greening. https://www.sciencedirect.com/journal/urban-forestry-and-urban-greening/special-issue/1045ZMW7L0V

Dawson, E. (2014). Equity in informal science education: developing an access and equity framework for science museums and science centres. *Studies in Science Education*, *50*(2), 209–247. https://doi.org/10.1080/03057267.2014.957558

De Bonis, L., Gisotti, M. R., & Masoni, R. (2016). *La pianificazione paesaggistica in Italia: stato dell'arte e innovazioni: Vol. (Territori; 26)* (A. Magnaghi, Ed.). Firenze University Press.

De Smith, M. J., Goodchild, M. F., & Longley, P. Al. (2018). *Geospatial analysis: A comprehensive guide to principles, techniques and software tools* (6th ed.). Winchelsea Press.

Decreto ministeriale no. 1444 del 2 aprile (1968). *Gazzetta Ufficiale della Repubblica Italiana*. https://www.gazzettaufficiale.it/eli/id/1968/04/16/1288Q004/sg

Decreto-Legge 6 maggio, no. 59 (2021). Misure urgenti relative al Fondo complementare al Piano nazionale di ripresa e resilienza e altre misure urgenti per gli investimenti. *Gazzetta Ufficiale della Repubblica Italiana*, no. 108 07/05/2021. https://www.normattiva.it/eli/id/2021/05/07/21G00070/CONSOLIDATED/20210730

Demir, A. (2014). Determination of the recreational value of botanic gardens. A case study Royal Botanic Gardens, Kew, London. *Revista de Cercetare Si Interventie Sociala*, *44*, 160–180.

Dempsey, N., Bramley, G., Power, S., & Brown, C. (2011). The social dimension of sustainable development: Defining urban social sustainability. *Sustainable Development*, *19*(5), 289–300. https://doi.org/10.1002/sd.417

Denyer, S. (2014). Cultural landscapes and the World Heritage Convention. In *Gardens & landscapes in historic building conservation* (pp. 321–329). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.ch32

Di Franco, C. P., Lima, G., Schimmenti, E., & Asciuto, A. (2021). Methodological approaches to the valuation of forest ecosystem services: An overview of recent international research trends. *Journal of Forest Science*, *67*(7), 307–317. https://doi.org/10.17221/13/2021-JFS

Doolittle, W. E. (2004). Gardens are us, we are Nature: Transcending Antiquity and Modernity. *Geographical Review*, *94*(3), 391–404. https://doi.org/10.1111/j.1931-0846.2004.tb00179.x

Du Preez, M., & Lee, D. E. (2016). The economic value of the Trans Baviaans mountain biking event in the Baviaanskloof Mega-Reserve, Eastern Cape, South Africa: A travel cost analysis using count data models. *Journal of Outdoor Recreation and Tourism*, *15*, 47–54. https://doi.org/10.1016/J.JORT.2016.07.003

Ehrlich, P. R., & Ehrlich, A. H. (1981). *Extinction : The causes and consequences of the disappearance of species*. Random House.

European Commission (2021, June 22). *Commission endorses Italy's €191.5 billion plan*. Press Release. https://ec.europa.eu/commission/presscorner/detail/en/ip_21_3126

European Commission (2022a). *A European Green Deal*. https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

European Commission (2022b). *Environmental Impact Assessment: Evaluating the effects of public and provate projects on the environment*. https://environment.ec.europa.eu/law-and-governance/environmental-assessments/environmental-impact-assessment_en

European Commission (2022c). *Italy's recovery and resilience plan*. https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility/italys-recovery-and-resilience-plan_en

European Commission (2022d). *Recovery and Resilience Facility*. https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en

European Commission (2022e). *Recovery plan for Europe*. https://ec.europa.eu/info/strategy/recovery-plan-europe_en

European Commission (2022f, March 26). *The European Semester*. https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester_en

European Environmental Agency (2022). Who benefits from nature in cities? Social inequalities in access to urban green and blue spaces across Europe. In *Briefing no. 15/2021*. https://doi.org/10.2800/160976

European Landscape Convention (2000). https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=0900001680080621

European Union (2013). Quality of life in cities: Perception survey in 79 European cities. In *European Urban Audit* (pp. 1–145). Publications Office of the European Union. https://web.archive.org/web/20220901015201/http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/urban/survey2013_en.pdf

European Union (2016). Quality of life in European Cities 2015. In *Flash Eurobarometer 419* (pp. 1–169). Publications Office of the European Union. https://doi.org/10.2776/870421

Evans, J., & Jones, P. (2011). The walking interview: Methodology, mobility and place. *Applied Geography*, *31*(2), 849–858. https://doi.org/10.1016/j.apgeog.2010.09.005

Fallahi, E. (2017). Horticulture in Iran can be an alternative to petroleum and a major source of international business with unique potential and challenges. *HortScience*, *52*(9), 1145–1147. https://doi.org/10.21273/HORTSCI12080-17

Fallahi, E., Fallahi, P., & Mahdavi, S. (2020). Ancient urban gardens of Persia: Concept, history, and influence on other world gardens. *HortTechnology*, *30*(1), 6–12. https://doi.org/10.21273/HORTTECH04415-19

Ferrucci, N. (2012). I giardini storici ed il paesaggio. *Diritto e Giurisprudenza Agraria, Alimentare e Dell'ambiente*, *IV*, 241–247.

Filippone, T. (2021, April 13). Legge urbanistica, Sicilia bocciata da Roma per la seconda volta. *Repubblica*. https://palermo.repubblica.it/politica/2021/04/13/news/legge_urbanistica_sicilia_bocciata_da_roma_per_la_seconda_volta-296319599/

First International Congress of Architects and Technicians of Historic Monuments (1931). *The Athens Charter for the Restoration of Historic Monuments.* https://www.icomos.org/en/charters-and-texts/179-articles-en-francais/ressources/charters-and-standards/167-the-athens-charter-for-the-restoration-of-historic-monuments

Flinck, M. (2016). Historic gardens in the center of Stockholm. In G. Groening, G. M. Moore, J. P. Rayner, & E. E. F. Moore (Eds.), *XXIX International Horticultural Congress on Horticulture: Sustaining Lives, Livelihoods and Landscapes(IHC2014): V International Conference on Landscape and Urban Horticulture and International Symposium on Sustainable Management in the Urban Forest* (Vol. 1108, pp. 115–121). *Int Soc Horticultural Science*. https://doi.org/10.17660/ActaHortic.2016.1108.14

Forster, M. (2014). Why Should There Be Any International Law Relating to Monuments and Cultural Landscapes? In *Gardens & landscapes in historic building conservation* (pp. 331–337). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.ch33

Funsten, C., Borsellino, V., & Schimmenti, E. (2020). A systematic literature review of historic garden management and its economic aspects. *Sustainability*, *12*(24). https://doi.org/10.3390/su122410679

Funsten, C., Borsellino, V., & Schimmenti, E. (2021). The appropriate legal and administrative measures: The Florence Charters and legislation governing the identification, listing and protection of historic gardens in Palermo, Sicily. *Restauro Archeologico*, *Special issue 2021*(2), 152–157. https://issuu.com/dida-unifi/docs/ra_special_issue_giardini_storici_2_2021

Gao, L., & Dietze-Schirdewahn, A. (2018). Garden culture as heritage: A pilot study of garden culture conservation based on Norwegian examples. *Urban Forestry and Urban Greening*, *30*, 239–246. https://doi.org/10.1016/j.ufug.2017.03.010

Garcia, C. S. G., Paiva, P. D. O., Alves, S. F. N. S. C., & Salgado, M. C. R. (2017). Transformations in the gardens and landscapes of the historical Traituba's Farm. *Ornamental Horticulture*, *23*(1), 45–57. https://doi.org/10.14295/oh.v23i1.953

Garrod, G., Pickering, A., & Willis, K. (1993). The economic value of botanic gardens: A recreational perspective. *Geoforum*, *24*(2), 215–224. https://doi.org/10.1016/0016-7185(93)90035-G

Gelardi, S. (2007). *Diritto dei beni culturali e ambientali - Corso di legislazione dei beni culturali*. Palumbo Ed.

Giampino, A. (2018). Consumo di suolo. In I. Vinci & P. la Greca (Eds.), *Sicilia: Rapporto sul territorio 2018: Vol. Urbanistica Dossier* (016 ed., pp. 27–30). INU Edizioni.

Goetcheus, C., & Mitchell, N. (2014). The Venice charter and cultural landscapes: Evolution of heritage concepts and conservation over time. *Change Over Time*, *4*(2), 338–357. https://doi.org/10.1353/cot.2014.0018

Goodchild, P. H. (2009). From the Florence Charter to the Florence Convention. In L. S. Pelissetti & L. Scazzosi (Eds.), *A 25 anni dalle Carte di Firenze: esperienze e prospettive* (Vol. 1, pp. 181–193). Leo S. Olschki.

Governo Italiano (2021). *Piano Nazionale de Ripresa e Resilienza (PNRR)* (pp. 1–269). https://www.governo.it/sites/governo.it/files/PNRR.pdf

Gradinaru, S. R., Onose, D. A., Oliveira, E., Slave, A. R., Popa, A. M., & Gravrilidis, A. A. (2023). Equity in urban greening: Evidence from strategic planning in Romania. *Landscape and Urban Planning*, *230*, 104614. https://doi.org/10.1016/J.LANDURBPLAN.2022.104614

Gratani, L. (2006). Didactic functionality - The Botanical Garden of Rome. *Italian Botanist*, *38*(1), 254–257.

Groom, B., Drupp, M. A., Freeman, M. C., & Nesje, F. (2022). The future, now : A review of social discounting. *Resource Economics*, *14*, 467–491. https://doi.org/10.1146/annurev-resource-111920-020721

Grove, J. M., Locke, D. H., & O'Neil-Dunne, J. P. M. (2014). An ecology of prestige in New York City: Examining the relationships among population density, socio-economic status, group identity, and residential canopy cover. *Environmental Management*, *54*(3), 402–419. https://doi.org/10.1007/s00267-014-0310-2

Groves, R. M., Flowler, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2004). *Survey Methodology* (R. M. Groves, G. Kalton, J. N. K. Rao, N. Schwarz, & C. Skinner, Eds.). John Wiley & Sons.

Guijarro, F., & Tsinaslanidis, P. (2020). Analysis of academic literature on environmental valuation. *International Journal of Environmental Research and Public Health*, *17*(7), 2386. https://doi.org/10.3390/ijerph17072386

Gullino, P., Devecchi, M., & Larcher, F. (2020). New sustainable approach for historical garden restoration: The case study of Ludwig Winter's Gardens in Liguria Region. *Acta Horticulturae*, *1279*, 9–14. https://doi.org/10.17660/ActaHortic.2020.1279.2

Gullino, P., Larcher, F., & Devecchi, M. (2010). The importance of the chestnut cultivation and its evolution in the Piedmont landscape (North-West Italy). *Acta Horticulturae*, *866*, 37–42. https://doi.org/10.17660/ActaHortic.2010.866.1

Habitats Directive (1992). European Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. http://data.europa.eu/eli/dir/1992/43/oj/eng

Haines-Young, R., & Potschin, M. (2018). *Common International Classification of Ecosystem Services (CICES) V5.1 Guidance on the Application of the Revised Structure*. www.cices.eu

Halbrooks, M. C. (2005). The English Garden at Stan Hywet Hall and gardens: Interpretation, analysis, and documentation of a historic garden restoration. *HortTechnology*, *15*(2), 196–213. https://doi.org/10.21273/HORTTECH.15.2.0196

Hall, T., & Shuck, S. M. (2021). Estimating the economic impact of a one-time event: The case of l'Hermione in Yorktown. *Nonprofit Management and Leadership*, *31*(4), 833–845. https://doi.org/10.1002/NML.21456

Hamel, P., Guerry, A. D., Polasky, S., Han, B., Douglass, J. A., Hamann, M., Janke, B., Kuiper, J. J., Levrel, H., Liu, H., Lonsdorf, E., McDonald, R. I., Nootenboom, C., Ouyang, Z.,

Remme, R. P., Sharp, R. P., Tardieu, L., Viguié, V., Xu, D., Zheng, H., & Daily, G. C. (2021). Mapping the benefits of nature in cities with the InVEST software. *Npj Urban Sustainability*, *1*(1), 1–9. https://doi.org/10.1038/s42949-021-00027-9

Hansen, O. K., Thomsen, P., & Rasmussen, C. W. (2014). DNA markers provide insight about common lime in historical plantings - An example from the Royal Danish Gardens. *Urban Forestry and Urban Greening*, *13*(3), 543–552. https://doi.org/10.1016/j.ufug.2014.04.001

Harney, M. (2014a). *Gardens & landscapes in historic building conservation*. John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107

Harney, M. (2014b). Introduction. &

Heagney, E. C., Rose, J. M., Ardeshiri, A., & Kovač, M. (2018). Optimising recreation services from protected areas – Understanding the role of natural values, built infrastructure and contextual factors. *Ecosystem Services*, *31*, 358–370. https://doi.org/10.1016/J.ECOSER.2017.10.007

Healy, R. G. (1994). The "common pool" problem in tourism landscapes. *Annals of Tourism Research*, *21*(3), 596–611. https://doi.org/10.1016/0160-7383(94)90122-8

Heldt, T., & Mortazavi, R. (2016). Estimating and comparing demand for a music event using stated choice and actual visitor behaviour data. *Scandinavian Journal of Hospitality and Tourism*, *16*(2), 130–142. https://doi.org/10.1080/15022250.2015.1117986

Hermes, J., van Berkel, D., Burkhard, B., Plieninger, T., Fagerholm, N., von Haaren, C., & Albert, C. (2018). Assessment and valuation of recreational ecosystem services of landscapes. *Ecosystem Services*, *31*, 289–295. https://doi.org/10.1016/J.ECOSER.2018.04.011

Heywood, V. H. (2017). The future of plant conservation and the role of botanic gardens. *Plant Diversity*, *39*(6), 309–313. https://doi.org/10.1016/j.pld.2017.12.002

Hodor, K., Przybylak, Ł., Kuśmierski, J., & Wilkosz-Mamcarczyk, M. (2021). Identification and analysis of problems in selected european historic gardens during the COVID-19 pandemic. *Sustainability*, *13*(3), 1–18. https://doi.org/10.3390/su13031332

Howell, K. (2013). *An introduction to the philosophy of methodology*. SAGE Publications Ltd. https://doi.org/10.4135/9781473957633

Hutcheson, W., Hoagland, P., & Jin, D. (2018). Valuing environmental education as a cultural ecosystem service at Hudson River Park. *Ecosystem Services*, *31*, 387–394. https://doi.org/10.1016/J.ECOSER.2018.03.005

Huynh, L. T. M., Gasparatos, A., Su, J., Lam, R. D., Grant, E. I., & Fukushi, K. (2022). Linking the nonmaterial dimensions of human-nature relations and human well-being through cultural ecosystem services. *Science Advances*, *8*(31), 8042. https://doi.org/10.1126/SCIADV.ABN8042/SUPPL_FILE/SCIADV.ABN8042_DATASET.ZIP

ICCD (2022). *Chi siamo*. http://www.iccd.beniculturali.it/it/istituto/chi-siamo

ICOMOS (1964). *International Charter for the Conservation and Restoration of Monuments and Sites (the Venice Charter 1964)*. https://www.icomos.org/charters/venice_e.pdf

ICOMOS (1994). *The Nara Document on Authenticity*. https://www.icomos.org/charters/nara-e.pdf

ICOMOS (2014). *The Florence Declaration on Heritage and Landscape as Human Values*. http://www.icomos.org.tr/Dosyalar/ICOMOSTR_en003495300153691209 6.pdf

ICOMOS General Assembly (2011). *The Valletta Principles for the Safeguarding and Management of Historic Cities, Towns and Urban Areas: Vol. XVII*. https://www.icomos.org/Paris2011/GA2011_CIVVIH_text_EN_FR_final_20120110.pdf

ICOMOS-IFLA (1982). Historic Gardens (The Florence Charter). https://www.icomos.org/images/DOCUMENTS/Charters/gardens_e.pdf

ICOMOS-IFLA (2017). Document on Historic Urban Parks. In *GA2017_6-3-2_HistoricUrbanPublicParks_EN_final20170730.pdf*. https://www.icomos.org/images/DOCUMENTS/General_Assemblies/19th_Delhi_2017/Working_Documents-First_Batch-August_2017/GA2017_6-3-2_HistoricUrbanPublicParks_EN_final20170730.pdf

Ievoli, C., Basile, R. G., & Belliggiano, A. (2017). The spatial patterns of dairy farming in Molise. *European Countryside*, *9*(4), 729–745. https://doi.org/10.1515/EUCO-2017-0041

INSPIRE Thematic Working Group Land Use (n.d.). *INSPIRE data specification on land use – Technical Guidelines | INSPIRE*. Retrieved January 11, 2023, from https://inspire.ec.europa.eu/id/document/tg/lu

Ionescu, R., Iliescu, A. F., & Dumitrascu, M. (2010). Historical garden as cultural identity mark in Bucharest urban landscape - Case study: The Kiseleff road and garden. *Acta Horticulturae*, *881*, 851–854. https://doi.org/10.17660/ACTAHORTIC.2010.881.141

ISPRS (2013). *ISPRS_brochure.pdf*. https://www.isprs.org/publications/brochure/ISPRS_brochure.pdf

ISTAT (2017). *Basi territoriali e variabili censuarie*. https://www.istat.it/it/archivio/104317

ISTAT (2022). *Popolazione residente al 1° gennaio : Tutti i comuni*. Dati ISTAT. http://dati.istat.it/viewhtml.aspx?il=blank&vh=0000&vf=0&vcq=1100&graph=0&view-metadata=1&lang=it&QueryId=19101&metadata=DCIS_POPRES1#

Italia Domani (2022a). *NRRP Investments*. https://italiadomani.gov.it/en/Interventi/investimenti.html

Italia Domani (2022b). *Site identity enhancement programmes: Historic parks and gardens*. https://italiadomani.gov.it/en/Interventi/investimenti/programmi-per-valorizzare-l-identita-di-luoghi-parchi-e-giardini-storici.html

Italian Ministry of Ecological Transition (2021, May 13). *Monthly fuel prices - Energy and mining analysis and statistics - Ministry of Ecological Transition*. https://dgsaie.mise.gov.it/prezzi_carburanti_mensili.php?lang=en_US

Italian Ministry of Health (2021, May 15). *COVID-19, nuova ordinanza del ministro speranza per contenere la diffusione del virus*. https://www.salute.gov.it/portale/nuovocoronavirus/dettaglioNotizieNuovoCoronavirus.jsp?lingua=italiano&menu=notizie&p=dalministero&id=5484

James, I., Hoffman, T., Munro, A., O'farrell, P., & Smart, R. (2007). The economic value of flower tourism at the Namaqua National Park, South Africa. *South African Journal of Economic and Management Sciences (SAJEMS)*, *10*(4), 442–456. https://doi.org/http://dx.doi.org/10.4102/sajems.v10i4.1058

James, P., & Magee, L. (2016). Domains of Sustainability. In A. Farazmand (Ed.), *Global Encyclopedia of Public Administration, Public Policy, and Governance* (pp. 1–17). Springer International Publishing. https://doi.org/10.1007/978-3-319-31816-5_2760-1

Jellicoe, G., & Jellicoe, S. (1995). *The landscape of man: Shaping the environment from prehistory to the present day* (3rd ed.). Thames and Hudson.

Jones, K. R. (2018). “The Lungs of the City”: Green space, public health and bodily metaphor in the landscape of urban park history. *Environment and History*, *24*(1), 39–58. https://doi.org/10.3197/096734018X15137949591837

Jordan, A., & Lenschow, A. (2000). “Greening” the European Union: What can be learned from the leaders of EU environmental policy? *European Environment*, *10*(3), 109–120. https://doi.org/10.1002/1099-0976(200005/06)10:3

Jordan, H. (1994). Public parks, 1885-1914. *Garden History*, *22*(1), 85. https://doi.org/10.2307/1587004

Journal of Cultural Heritage (JHC). (n.d.). *About the journal*. https://www.journals.elsevier.com/journal-of-cultural-heritage

Kadykalo, A. N., López-Rodriguez, M. D., Ainscough, J., Droste, N., Ryu, H., Ávila-Flores, G., le Clec’h, S., Muñoz, M. C., Nilsson, L., Rana, S., Sarkar, P., Sevecke, K. J., & Harmáčková, Z. v. (2019). Disentangling ‘ecosystem services’ and ‘nature’s contributions to people.’ *Ecosystems and People*, *15*(1), 269–287. https://doi.org/10.1080/26395916.2019.1669713/SUPPL_FILE/TBSM_A_1669713_SM7315.PDF

Kalogirou, S., & Chalkias, C. (2014). Mapping environmental risks: Quantitative and spatial modeling approaches. *Journal of Maps,* 10:2, 183-185. https://doi.org/10.1080/17445647.2014.890135

Kempiak, J., Hollywood, L., Bolan, P., & McMahon-Beattie, U. (2017). The heritage tourist: An understanding of the visitor experience at heritage attractions. *International Journal of Heritage Studies*, *23*(4), 375–392. https://doi.org/10.1080/13527258.2016.1277776

Kerschner, F., & Wagner, E. (2015). Sustainability—A long, hard road. *Legal Aspects of Sustainable Development: Horizontal and Sectorial Policy Issues*, 57–78. https://doi.org/10.1007/978-3-319-26021-1_4

Khalilnezhad, S. M. R. (2017). Principles of integration of the agriculture and pleasure greeneries in Persian gardens. *Acta Horticulturae*, *1189*, 39–42. https://doi.org/10.17660/ActaHortic.2017.1189.7

Kowarik, I., & Wohlgemuth, J. O. (2006). *Tulipa sylvestris* (*Liliaceae*) in northwestern Germany: A non-indigenous species as an indicator of previous horticulture. *Polish Botanical Studies*, *22*, 317–331. http://www.ib-pan.krakow.pl/.../pbs.htm

Krishnan, S., & Novy, A. (2016). The role of botanic gardens in the twenty-first centuryy. *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*, *11*. https://doi.org/10.1079/PAVSNNR201611023

Kristiánová, K., & Štěpánková, R. (2015). Green infrastructure of historic city cores – Case studies from Slovakia. *Int. Multidisciplinary Sci. Geoconf. Surveying Geology Mining Ecology Manage., SGEM*, *2*, 437–444. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84964221809&partnerID=40&md5=d4707cc5e3d0329168e467897d951747

Krosigk, K. von. (1987). Preservation and maintenance of historic gardens and parks in West Germany. *Landscape Research*, *12*(2), 18–21. https://doi.org/10.1080/01426398708706227

Kulczyk, S., Woźniak, E., & Derek, M. (2018). Landscape, facilities and visitors: An integrated model of recreational ecosystem services. *Ecosystem Services*, *31*, 491–501. https://doi.org/10.1016/J.ECOSER.2018.02.016

Kümmerling, M., & Müller, N. (2012). The relationship between landscape design style and the conservation value of parks: A case study of a historical park in Weimar, Germany.

Landscape and Urban Planning, *107*(2), 111–117. https://doi.org/10.1016/J.LANDURBPLAN.2012.05.006

Landscape and Urban Planning (n.d.). *About the journal*. https://www.journals.elsevier.com/landscape-and-urban-planning

Landscape Research Group (n.d.). *Our Journal*. Https://Landscaperesearch.Org/. Retrieved November 24, 2020, from https://landscaperesearch.org/our-journal/

Lautenbach, S., Mupepele, A.-C., Dormann, C. F., Lee, H., Schmidt, S., Scholte, S. S. K., Seppelt, R., van Teeffelen, A. J. A., Verhagen, W., & Volk, M. (2019). Blind spots in ecosystem services research and challenges for implementation. *Regional Environmental Change*, *19*(8). https://doi.org/10.1007/s10113-018-1457-9

Lebrun, A. M., Su, C. J., & Bouchet, P. (2021). Domestic tourists' experience in protected natural parks: A new trend in pandemic crisis? *Journal of Outdoor Recreation and Tourism*, *35*, 100398. https://doi.org/10.1016/J.JORT.2021.100398

Legge Costituzionale 11 febbraio 2022, no. 1 "Modifiche agli articoli 9 e 41 della Costituzione in materia di tutela dell'ambiente" (2022). *Gazzetta Ufficiale della Repubblica Italiana* no.44 del 22-02-2022. https://www.normattiva.it/atto/caricaDettaglioAtto?atto.dataPubblicazioneGazzetta=2022-02-22&atto.codiceRedazionale=22G00019&atto.articolo.numero=1&atto.articolo.sottoArticolo=1&atto.articolo.tipoArticolo=0

Leiper, N. (1990). Tourist attraction systems. *Annals of Tourism Research*, *17*(3), 367–384. https://doi.org/10.1016/0160-7383(90)90004-B

Li, S., Bing, Z., & Jin, G. (2019). Spatially explicit mapping of soil conservation service in monetary units due to land use/cover change for the Three Gorges Reservoir area, China. *Remote Sensing*, *11*(4), 468. https://doi.org/10.3390/rs11040468

Liston-Heyes, C., & Heyes, A. (1999). Recreational benefits from the Dartmoor National Park. *Journal of Environmental Management*, *55*(2), 69–80. https://doi.org/10.1006/jema.1998.0244

Lithgow, K., & Thackray, D. (2009). Conservation principles in practice. In *Conservation bulletin* (Issue 60, pp. 16–19). https://nt.global.ssl.fastly.net/documents/the-evolution-of-conservation-principles.pdf

Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic information science and systems* (4th ed.). Wiley. https://www.wiley.com/en-gb/Geographic+Information+Science+and+Systems%2C+4th+Edition-p-9781119031307

Lourdes, K. T., Hamel, P., Gibbins, C. N., Sanusi, R., Azhar, B., & Lechner, A. M. (2022). Planning for green infrastructure using multiple urban ecosystem service models and multicriteria analysis. *Landscape and Urban Planning*, *226*, 104500. https://doi.org/10.1016/J.LANDURBPLAN.2022.104500

Lowenthal, D. (2015). *The past is a foreign country revisited*. Cambridge University Press.

Lusiani, M., Cristina Heras, V., Wijffels, A., Cardoso, F., Vandesande, A., Santana, M., Van Orshoven, J., Steenberghen, T., & Van Balen, K. (2013). A value-based monitoring system to support heritage conservation planning. *Journal of Cultural Heritage Management and Sustainable Development*, *3*(2), 130–147. https://doi.org/10.1108/JCHMSD-10-2012-0051/FULL/XML

Luz, I. C. A., Paiva, P. D. de O., & Alves, S. F. N. da S. C. (2018). Train station area gardens: The creation and evolution of Dr. José Esteves Square, in Lavras-MG. *Ornamental Horticulture*, *23*(4), 432–443. https://doi.org/10.14295/oh.v23i4.1117

MA (2005). *Ecosystems and human well-being: Synthesis* (Millennium Ecosystem Assessment, Ed.). Island Press.

Mace, G. M. (2014). Whose conservation? *Science*, *345*(6204), 1558–1560. https://doi.org/10.1126/SCIENCE.1254704/ASSET/62820AF1-7DE5-486B-BEED-DA5BB5332D75/ASSETS/GRAPHIC/345_1558_F3.JPEG

Mahdizadeh, S., & Rajendran, L. P. (2019). A renewed approach to conservation policy of historical gardens in Iran. *Landscape Research*, *44*(1), 48–61. https://doi.org/10.1080/01426397.2017.1413176

Mahmood, P., & Nasim, S. (2012). *The manner of rehabilitation of historical vernacular gardens (case study is Ali Abad Garden in Bojnourd-Iran)* (J. Jasienko, Ed.). Dolnoslaskie Wydawnictwo Edukacyjne-Dwe.

Malinverni, E. S., Chiappini, S., & Pierdicca, R. (2019). A geodatabase for multisource data management applied to cultural heritage: The case study of Villa Buonaccorsi's historical garden. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, *XLII-2/W11*, 771–776. https://doi.org/10.5194/isprs-archives-XLII-2-W11-771-2019

Mandle, L., & Natural Capital Project. (2019). Database of publications using InVEST and other Natural Capital Project software . In *Stanford Research Data*. Stanford Digital Repository. https://purl.stanford.edu/bb284rg5424

Mang, B. (2013). The Austrian Federal Gardens and their plant collections – Historical garden monuments, cultural heritage, recreational spaces and tourist attractions. *Englera*, *30*, 137–144. http://www.jstor.org/stable/24365189

Markwell, S., Bennett, M., & Ravenscroft, N. (1997). The changing market for heritage tourism: A case study of visits to historic houses in England. *International Journal of Heritage Studies*, *3*(2), 95–108. https://doi.org/10.1080/13527259708722193

Marone, E., Riccioli, F., Scozzafava, G., & Fratini, R. (2010). Il valore d'uso delle aree verdi: La stima dell'universo dei fruitori di alcuni parchi urbani fiorentini. *Aestimum*, *57*, 143–169. https://doi.org/10.13128/AESTIMUM-9096

Masaf (2017). *Norme per lo sviluppo di spazi verdi urbani, L. 10 del 14/01/2013*. https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/11269

Masaf (2022a). *Elenco degli alberi monumentali d'Italia ai sensi della Legge n. 10/2013 e del Decreto 23 ottobre 2014*. https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/11260

Masaf (2022b). 2022.07_ShapefileAMI. In *Elenco degli alberi monumentali d'Italia*. Difor4.

Maurer, U., Peschel, T., & Schmitz, S. (2000). The flora of selected urban land-use types in Berlin and Potsdam with regard to nature conservation in cities. *Landscape and Urban Planning*, *46*(4), 209–215. https://doi.org/10.1016/S0169-2046(99)00066-3

Mayer, M., & Woltering, M. (2018). Assessing and valuing the recreational ecosystem services of Germany's national parks using travel cost models. *Ecosystem Services*, *31*, 371–386. https://doi.org/10.1016/J.ECOSER.2017.12.009

Mazza, I. (2002). Organization and decision-making in the heritage sector in Sicily. In I. Rizzo & R. Towse (Eds.), *The economics of heritage: a study in the political economy of culture in Sicily* (pp. 48–62). Edward Elgar Pub.

Meda, P., & Rinaldi, G. (2006). Gestione e apertura a un pubblico non universitario degli Orti botanici universitari, sintesi di un questionario di autovalutazione. *Informatore Botanico Italiano (Atti "Giardino Storico e Orto Botanico: Un bene culturale al servizio della comunità", Erba 11-12/03/2005)*, *38*(1), 312–314.

Mert-Cakal, T., & Miele, M. (2020). 'Workable utopias' for social change through inclusion and empowerment? Community supported agriculture (CSA) in Wales as social innovation. *Agriculture and Human Values*, *37*(4), 1241–1260. https://doi.org/10.1007/S10460-020-10141-6/TABLES/5

Mignosa, A. (2002). The organization and finance of cultural heritage in Sicily. In I. Rizzo & R. Towse (Eds.), *The economics of heritage, a study in the political economy of culture in Sicily* (pp. 20–30). Edward Elgar Pub.

Milbourne, P. (2021). Growing public spaces in the city: Community gardening and the making of new urban environments of publicness. *Urban Studies*, *58*(14), 2901–2919. https://doi.org/10.1177/0042098020972281

Ministero della Cultura (2021). Avviso pubblico per la presentazione di Proposte di intervento per il restauro e la valorizzazione di parchi e giardini storici. In *Avviso pubblico*. https://media.beniculturali.it/mibac/files/boards/388a5474724a15af0ace7a40ab3301de/SG/PNRR%20Intervento%202.3%20-%20Avviso_Parchi-Giardini+Allegato-signed-signed.pdf

Ministero della Cultura (2022a). Allegato B2: Graduatorie delle proposte ammesse a finanziamento suddivise per macroaree - MACROAREA SUD. In *Decreto SG no. 504 21/06/2022 Approvazione della graduatoria di merito complessiva delle proposte ammesse a valutazione di parchi e giardini*. https://media.beniculturali.it/mibac/files/boards/be78e33bc8ca0c99bff70aa174035096/Bottoni/Recovery/PDF/DDParchiGiardini/AllegatoB2_Sud%20(1).pdf

Ministero della Cultura (2022b, June 21). *Approvazione della graduatoria di merito complessiva delle proposte ammesse a valutazione di parchi e giardini - Ministero della cultura*. Decreto SG no. 504 21/06/2022 . https://cultura.gov.it/comunicato/decreto-sg-n-504-21062022-approvazione-della-graduatoria-di-merito-complessiva-delle-proposte-ammesse-a-valutazione-di-parchi-e-giardini#contenuto

Ministero della Cultura (2022c, June 21). *Assegnazione delle risorse a valere sul PNRR, Missione 1 – Digitalizzazione, innovazione, competitività e cultura, Component 3 – Cultura 4.0 (M1C3), Misura 2 "Rigenerazione di piccoli siti culturali, patrimonio culturale, religioso e rurale", Investimento 2.3: "Programmi per valorizzare l'identità dei luoghi: parchi e giardini storici" del PNRR finanziato dall'Unione europea – NextGenerationEU*. Decreto SG no. 505 21/06/2022 .

Ministero della Cultura (2022d, July 8). *Assegnazione delle risorse alle Regioni: attività di formazione professionale per "Giardinieri d'Arte" - Decreto SG 589 08/07/22 - PNRR M1C3, Investimento 2.3*. Decreto Del Segretario Generale no. 589 Del 08/07/22. https://pnrr.cultura.gov.it/assegnazione-delle-risorse-alle-regioni-attivita-di-formazione-professionale-per-giardinieri-darte-decreto-sg-589-08-07-22-pnrr-m1c3-investimento-2-3/

Ministero della Cultura (2023, January 12). *Approvazione graduatoria di merito aggiornata*. Decreto SG 21 Del 12/01/23 – PNRR M1C3 Investimento 2.3 Parchi e Giardini Storici. https://cultura.gov.it/comunicato/approvazione-graduatoria-di-merito-aggiornata-decreto-sg-21-del-120123-pnrr-m1c3-investimento-23-parchi-e-giardini-storici

Ministero della Cultura (n.d.). *Catalogo Generale dei Beni Culturali - esito ricerca architettura a Palermo*. Retrieved January 11, 2023, from

https://www.catalogo.beniculturali.it/search?denom=&definizione=&period=&agent=&culturalScope=&province=PA&municipality=Palermo&region=&subject=&numICCD=&classfication=&corporatBody=&techCha=&cis=&site=&typology=Architettura

Ministero della Cultura, & ICCD (2022a). *Catalogo Generale dei Beni Culturali*. https://www.catalogo.beniculturali.it/

Ministero della Cultura, & ICCD (2022b). *Cos'è il catalogo generale dei beni culturali*. https://www.catalogo.beniculturali.it/progetto

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., The Prisma Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA Statement. *PLOS Medicine*, *6*(7), e1000097. https://doi.org/10.1371/JOURNAL.PMED.1000097

Moseley, D., Connolly, T., Sing, L., & Watts, K. (2018). Developing an indicator for the physical health benefits of recreation in woodlands. *Ecosystem Services*, *31*, 420–432. https://doi.org/10.1016/J.ECOSER.2017.12.008

Moser, S. (2023). The garden visitor experience. *Museum Management and Curatorship*, 1–17. https://doi.org/10.1080/09647775.2022.2158914

Mwebaze, P., & Bennett, J. (2012). Valuing Australian botanic collections: A combined travel-cost and contingent valuation study. *Australian Journal of Agricultural and Resource Economics*, *56*(4). https://doi.org/10.1111/j.1467-8489.2012.00595.x

Myers, D. (2016). Heritage inventories: promoting effectiveness as a vital tool for sustainable heritage management. *Journal of Cultural Heritage Management and Sustainable Development*, *6*(2), 102–112. https://doi.org/10.1108/JCHMSD-02-2016-0009/FULL/XML

Mynors, C. (2014). Legal protection for structures, trees and wildlife. In M. Harney (Ed.), *Gardens & landscapes in historic building conservation*, (pp. 291–300). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.ch29

Nascimbene, J., & Salvadori, O. (2008). Lichen recolonization on restored calcareous statues of three Venetian villas. *International Biodeterioration & Biodegradation*, *62*(3), 313–318. https://doi.org/10.1016/j.ibiod.2007.11.005

Natural Capital Project (2021). *Urban InVEST: Designing resilient cities by nature*. Invest Webpage. https://naturalcapitalproject.stanford.edu/software/urban-invest

Natural England (2008). *Preparing a Heritage Management Plan* (pp. 1–53). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/350304/NE63-preparing-a-heritage-management-plan.pdf

Neonato, F., Colaninno, B., & Tomasinelli, F. (2018). Green ecosystem services: TEV as tool to take decision for urban Planning. *Economics and Policy of Energy and the Environment*, *2018*(2), 85–112. https://doi.org/10.3280/EFE2018-002005

Nesbitt, L., Meitner, M. J., Girling, C., Sheppard, S. R. J., & Lu, Y. (2019). Who has access to urban vegetation? A spatial analysis of distributional green equity in 10 US cities. *Landscape and Urban Planning*, *181*, 51–79. https://doi.org/10.1016/j.landurbplan.2018.08.007

Nind, M., Coverdale, A., & Meckin, R. (2021). *Changing social research practices in the context of COVID-19: Rapid evidence review*. National Centre for Research Methods. https://eprints.ncrm.ac.uk/id/eprint/4458/

Nyerges, T. L., & Jankowski, P. (2010). Introduction: Need for geographic information systems in decision support. In *Regional and Urban GIS: A Decision Support Approach* (pp. 3–14). The Guilford Press. https://books.google.it/books?hl=en&lr=&id=QyEIBAixuzkC&oi=fnd&pg=PP1&ots=m

zeflftHxY&sig=QGdwytvcAAl-u0Pop9UNhqjIFpA&redir_esc=y#v=onepage&q&f=false

O'Neill, M., & Roberts, B. (2019). *Walking Methods: Research on the move*. Routledge.

Obad Šćitaroci, M., Marić, M., Vahtar-Jurković, K., & Knežević, K. R. (2019). *Revitalisation of historic gardens—Sustainable models of renewal*. Springer. https://doi.org/10.1007/978-3-030-10612-6_27

Oishi, Y. (2019). Urban heat island effects on moss gardens in Kyoto, Japan. *Landscape and Ecological Engineering*, *15*(2), 177–184. https://doi.org/10.1007/s11355-018-0356-z

Olsen, J. R., Nicholls, N., & Mitchell, R. (2019). Are urban landscapes associated with reported life satisfaction and inequalities in life satisfaction at the city level? A cross-sectional study of 66 European cities. *Social Science & Medicine*, *226*, 263–274. https://doi.org/10.1016/J.SOCSCIMED.2019.03.009

Orto Botanico (2022). *Tariffe*. http://ortobotanico.unipa.it/tariffe.html

Oxford Economics (2016). *Economic Valuation of the Royal Botanic Gardens, Kew*. https://www.oxfordeconomics.com/recent-releases/economic-valuation-of-the-royal-botanic-gardens-kew

Paiva, P. D. de O., Sousa, R. De B., & Carcaud, N. (2020). Flowers and gardens on the context and tourism potential. *Ornamental Horticulture*, *26*(1), 121–133. https://doi.org/10.1590/2447-536x.v26i1.2144

Pappalardo, G., Toscano, S., & Pecorino, B. (2020). Assessing the effects of "appeal to authority" in the evaluation of environmental goods. Evidences from an economic experiment in Mt Etna, Italy. *Aestimum*, *77*, 113–125. https://doi.org/10.13128/AESTIM-8365

Pearce, D., Atkinson, G., & Mourato, S. (2006). Cost-benefit analysis and the environment: Recent developments. Organisation for Economic Cooperation and Development (OECD). https://doi.org/10.1787/9789264010055-EN

Pérez-Urrestarazu, L., Egea, G., Ruiz-Alcalá, C., Roldán-Olmo, F., & Fernández-Cañero, R. (2018). Water management assessment in a historic garden: the case study of the Real Alcazar (Seville, Spain). *Urban Forestry & Urban Greening*, *29*, 192–199. https://doi.org/10.1016/j.ufug.2017.11.020

Perloff, J. M. (2018). *Microeconomics - Global edition* (8th ed.). Pearson.

Phillips, A. (2014). The international context - the European Landscape Convention. In *Gardens & landscapes in historic building conservation* (pp. 309–320). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.ch31

Piante Faro (2020). *Catalogo Piante Faro*. https://www.piantefaro.com/wp-content/uploads/2021/02/Catalogo-PianteFaro-2020-21.pdf

Pickering, C., & Byrne, J. (2014). The benefits of publishing systematic quantitative literature reviews for PhD candidates and other early-career researchers. *Higher Education Research & Development (HERD)*, *33*(3), 534–548. https://doi.org/10.1080/07294360.2013.841651

Pinto, L. V., Inácio, M., Ferreira, C. S. S., Ferreira, A. D., & Pereira, P. (2022). Ecosystem services and well-being dimensions related to urban green spaces – A systematic review. *Sustainable Cities and Society*, *85*. https://doi.org/10.1016/J.SCS.2022.104072

Pirajno, R., Flaibani, A., Barbera, G., & Raimondo, F. M. (2015). *Guida ai giardini pubblici di Palermo* (R. Pirajno & A. Flaibani, Eds.). Salvare Palermo.

Pirrone, G., Mauro, E., & Sessa, E. (1989). *"Palermo, detto paradiso di Sicilia" (Ville e Giardini, XII-XX secolo)* (Vol. 1). Centro Studi di Storia e Arte dei Giardini.

Poria, Y., Butler, R., & Airey, D. (2004). Links between tourists, heritage, and reasons for visiting heritage sites. *Journal of Travel Research*, *43*(1), 19–28. https://doi.org/10.1177/0047287504265508

Potschin, M., & Haines-Young, R. (2016). Defining and measuring ecosystem services. In M. Potschin, R. Haines-Young, R. Fish, & R. K. Turner (Eds.), *Routledge handbook of ecosystem services* (pp. 25–44). Routledge.

Pouperová, O., Dienstbier, F., & Vícha, O. (2015). International documents on landscape restoration. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *63*(4), 1331–1344. https://doi.org/10.11118/actaun201563041331

Powe, N. A., & Willis, K. G. (1996). Benefits received by visitors to heritage sites: A case study of Warkworth Castle. *Leisure Studies*, *15*(4), 259–275. https://doi.org/10.1080/026143696375558

Powe, N. A., Garrod, G. D., & Willis, K. G. (1995). Valuation of urban amenities using an hedonic price model. *Journal of Property Research*, *12*(2), 137–147. https://doi.org/10.1080/09599919508724137

Powledge, F. (2011). The evolving role of botanical gardens: Hedges against extinction, showcases for botany? *BioScience*, *61*(10), 743–749. https://doi.org/10.1525/bio.2011.61.10.3

Prayaga, P., Rolfe, J., & Sinden, J. (2006). A travel cost analysis of the value of special events: Gemfest in Central Queensland. *Tourism Economics*, *12*(3), 403–420. https://doi.org/10.5367/000000006778493592

Prigioniero, A., Sciarrillo, R., Spuria, L., Zuzolo, D., Marziano, M., Scarano, P., Tartaglia, M., & Guarino, C. (2021). Role of historic gardens in biodiversity-conservation strategy: The example of the Giardino Inglese of Reggia di Caserta (UNESCO) (Italy). *Plant Biosystems - An International Journal Dealing with All Aspects of Plant Biology*, *155*(5), 983–993. https://doi.org/10.1080/11263504.2020.1810812

Puhakka, R. (2021). University students' participation in outdoor recreation and the perceived well-being effects of nature. *Journal of Outdoor Recreation and Tourism*, *36*, 100425. https://doi.org/10.1016/J.JORT.2021.100425

Ramsar Convention on Wetlands of International Importance especailly as Waterfowl Habitat (1971). https://www.ramsar.org/sites/default/files/documents/library/scan_certified_e.pdf

Raper, J. (1999). Spatial representation: The scientist´s perspective. In Longely P.A., Goodchild M.F., Maquire D.J., & Rhind D..W (Eds.), *Geographical Information Systems: Principles and technical issues* (2nd ed., pp. 61–70). Wiley.

Reeves, J. P., John, C. H. D., Wood, K. A., & Maund, P. R. (2021). A qualitative analysis of UK wetland visitor centres as a health resource. *International Journal of Environmental Research and Public Health. 18*(16), 8629. https://doi.org/10.3390/IJERPH18168629

Regione Siciliana (2020, September 14). *Codici EPSG in uso per la Sicilia*. Sistema Informativo Territoriale Regionale. https://www.sitr.regione.sicilia.it/codici-epsg-in-uso-per-la-sicilia/

Regione Siciliana Assessorato Beni Culturali Ambientali e Pubblica Istruzione (2009). *Azione A - Realizzazione del Catalogo unico informatizzato Regionale dei BB.CC.AA. intersettoriale ed interdisciplinare*. Programma Operativo Regionale Sicilia 2000/2006. https://www2.regione.sicilia.it/beniculturali/dirbenicult/info/por/202/AzioneA.htm

Regione Siciliana, Assessorato del bilancio e delle finanze (2001). Circolare 23 maggio 2001, no. 4. Trattamento economico e giuridico delle missioni del personale. Adempimenti delle Ragionerie centrali. In *Gazzetta Ufficiale della Regione Siciliana* (Issue 35). http://www.gurs.regione.sicilia.it/Gazzette/g01-35-d.htm

Regolamento sulla collaborazione cittadini e amministrazione per la cura e la rigenerazione dei beni comuni urbani (2014). Comune di Bologna. http://www.comune.bologna.it/sites/default/files/documenti/REGOLAMENTO%20BENI%20COMUNI.pdf

Regulation EU 2020/852, Article 17, (2020) (testimony of European Parliament and Council of the EU). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32020R0852#d1e2492-13-1

Remme, R. P., Frumkin, H., Guerry, A. D., King, A. C., Mandle, L., Sarabu, C., Bratman, G. N., Giles-Corti, B., Hamel, P., Han, B., Hicks, J. L., James, P., Lawler, J. J., Lindahl, T., Liu, H., Lu, Y., Oosterbroek, B., Paudel, B., Sallis, J. F., Schipperijin, J., Sosič, R., De Vries, S., Wheeler, B.W., Wood, S.A., Wu, T., & Daily, G. C. (2021). An ecosystem service perspective on urban nature, physical activity, and health. *Proceedings of the National Academy of Sciences of the United States of America*, *118*(22), e2018472118. https://doi.org/10.1073/pnas.2018472118

Rigolon, A. (2016). A complex landscape of inequity in access to urban parks: A literature review. *Landscape and Urban Planning*, *153*, 160–169. https://doi.org/10.1016/J.LANDURBPLAN.2016.05.017

Rio Convention on Biological Diversity (1992). https://www.cbd.int/doc/legal/cbd-en.pdf

Rizzo, I. (2002). Heritage conservation: The role of heritage authorities. In I. Rizzo & R. Towse (Eds.), *The economics of heritage, a study in the political economy of culture in Sicily* (pp. 31–47). Edward Elgar Publishing.

Rizzo, I., & Towse, R. (Eds.). (2002). *The Economics of Heritage*. Edward Elgar Publishing. https://EconPapers.repec.org/RePEc:elg:eebook:2770

Rogers, E. B. (2001). *Landscape design, A cultural and architectural history* (J. Moore & R. A. Gallin, Eds.). Harry N. Abrams, Inc.

Rostami, R., Lamit, H., Khoshnava, S., Rostami, R., & Rosley, M. (2015). Sustainable cities and the contribution of historical urban green spaces: A case study of historical Persian gardens. *Sustainability*, *7*(10), 13290–13316. https://doi.org/10.3390/su71013290

Saeed, M., Qasim, M., Khan, M. M., & Ali, T. (2017). Historic gardens can attract more visitors by the provision of more facilities: A case study of Three Mughal gardens of Pakistan. *Pakistan Journal of Agricultural Sciences*, *54*(01), 45–50. https://doi.org/10.21162/PAKJAS/17.5478

Sales, J. (2000). Conserving historic gardens. *Journal of Architectural Conservation*, *6*(2), 72–84. https://doi.org/10.1080/13556207.2000.10785271

Sanders, D. L., Ryken, A. E., & Stewart, K. (2018). Navigating nature, culture and education in contemporary botanic gardens. *Environmental Education Research*, *24*(8), 1077–1084. https://doi.org/10.1080/13504622.2018.1477122

Sarta, G. (2015). Perimetrazione zonizzazione P.R.G. vigente. In *Comune di Palermo Open Data*. Assessorato Riqualificazione urbana e infrastrutture (area tecnica). https://opendata.comune.palermo.it/opendata-dataset.php?dataset=320

Società Botanica Italiana Onlus (SBI) (2011). *Elenco degli orti botanici italiani*. Società Botanica Italiana Onlus Webpage. http://www.ortobotanicoitalia.it/gli-orti-botanici/

Scazzosi, L. (2017). Verso una nuova carta internazionale sui guardini. *Ananke Firenze*, *80*, 123–125.

Scheaffer, R. L., Mendenhall, W. I., Ott, R. L., & Gerow, K. (2012). *Elementary Survey Sampling* (7th ed.). Brooks/Cole.

Schicchi, R., & Gagliano Candela, A. (2021). *Structured interview, "Indagine sulla Gestione dei Giardini, Parchi Urbani e Orti Botanici Storici Siciliani relativa agli anni 2019 e 2020 - Orto Botanico dell'Università degli Studi di Palermo."*

Schilling, H. T., Riley, I. J., Puckeridge, A. C., Milne-Muller, A., & Callaghan, C. T. (2022). Economic value of regional spearfishing competitions. *Fisheries Research*, *250*. https://doi.org/10.1016/J.FISHRES.2022.106289

Schirpke, U., Scolozzi, R., da Re, R., Masiero, M., Pellegrino, D., & Marino, D. (2018). Recreational ecosystem services in protected areas: A survey of visitors to Natura 2000 sites in Italy. *Journal of Outdoor Recreation and Tourism*, *21*, 39–50. https://doi.org/10.1016/J.JORT.2018.01.003

Seiler, J. (2020). *Management regimes for lawns and hedges in historic gardens*. https://gupea.ub.gu.se/handle/2077/62813

Sharp, R., Douglass, J., Wolny, S., Arkema, K., Bernhardt, J., Bierbower, W., Chaumont, N., Denu, D., Fisher, D., Glowinski, K., Griffin, R., Guannel, G., Guerry, A., Johnson, J., Hamel, P., Kennedy, C., Kim, C. K., Lacayo, M., Lonsdorf, E., Mandle, L., Rogers, L., Silver, J., Toft, J., Verutes, G., Vogl, A. L., Wood, S., & Wyatt, K. (2020). *InVEST 3.12.0.post5+ug.g36c92d2 User's Guide*. The Natural Capital Project, Stanford University, University of Minnesota, The Nature Conservancy, and World Wildlife Fund. https://storage.googleapis.com/releases.naturalcapitalproject.org/invest-userguide/latest/index.html

Silva, S., & Carvalho, P. (2019). Visiting gardens in Portugal: Profiling the historic gardens visit and visitors. *Tourism Innovation: Technology, Sustainability and Creativity*, 127–147. https://doi.org/10.4324/9780429022814-9/VISITING-GARDENS-PORTUGAL-SUSANA-SILVA-PAULO-CARVALHO

Sinclair, M., Mayer, M., Woltering, M., & Ghermandi, A. (2020). Valuing nature-based recreation using a crowdsourced travel cost method: A comparison to onsite survey data and value transfer. *Ecosystem Services*, *45*, 101165. https://doi.org/10.1016/J.ECOSER.2020.101165

Sole 24 Ore. (2022). *Qualità della vita 2022: la classifica delle province italiane dove si vive meglio. Bologna la migliore nel 2022 | Il Sole 24 ORE*. Qualità Della Vita 2022. https://lab24.ilsole24ore.com/qualita-della-vita/palermo

Speciale, M. (2018). Le collezioni. In Sistema Museale di Ateneo (Ed.), *Orto Botanico - guida per il visitatore* (pp. 35–50). Palermo University Press.

SSEEA-EA (2021). *System of environmental-economic accounting — ecosystem accounting: Final draft version 5*. https://unstats.un.org/unsd/statcom/52nd-session/documents/BG-3f-SEEA-EA_Final_draft-E.pdf

Star, M., Rolfe, J., & Brown, J. (2020). From farm to fork: Is food tourism a sustainable form of economic development? *Economic Analysis and Policy*, *66*, 325–334. https://doi.org/10.1016/J.EAP.2020.04.009

Surano, N. (2021). Personal communication. *Zagara visitors*.

Tahzeeda, J., Khan, M. R., & Bashar, R. (2018). Valuation approaches to ecosystem goods and services for the National Botanical Garden, Bangladesh. *Environmental and Socio-Economic Studies*, *6*(1), 1–9. https://doi.org/10.2478/ENVIRON-2018-0001

TEEB (2010). Integrating the ecological and economic dimensions in biodiversity and ecosystem service valuation. In P. Kumar (Ed.), *The economics of ecosystems and biodiversity: The ecological and economic foundations* (pp. 3-40). Earthscan. http://www.teebweb.org/wp-content/uploads/2013/04/D0-Chapter-1-Integrating-the-ecological-and-economic-dimensions-in-biodiversity-and-ecosystem-service-valuation.pdf

Tempesta, T. (2014). People's preferences and landscape evaluation in Italy: A review. *New Medit*, *1*, 10.

Tempesta, T. (2016). Benefits and costs of urban parks: A review. *Aestimum*, 67, 127–143 Pages. https://doi.org/10.13128/AESTIMUM-17943

Tempesta, T. (2018a). *Estimo ambientale*. CLEUP sc.

Tempesta, T. (2018b). Degradation of the Palladian landscape. *Aestimum*, 72, 109–130. https://doi.org/10.13128/AESTIMUM-23971

Tempesta, T., Vecchiato, D., & Girardi, P. (2014). The landscape benefits of the burial of high voltage power lines: A study in rural areas of Italy. *Landscape and Urban Planning*, *126*, 53–64. https://doi.org/10.1016/J.LANDURBPLAN.2014.03.003

The Birds Directive (2009). Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. http://data.europa.eu/eli/dir/2009/147/2019-06-26

The Granada Convention for the Protection of the Architectural Heritage of Europe (1985). European Treaty Series 121. https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=121

Thoday, P. (2014). Science and Craft in Understanding Historic Gardens and Their Management. In M. Harney (Ed.), *Gardens & landscapes in historic building conservation* (pp. 141–148). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.ch13

Thorne, N. (2014). Costing and Contracts for Historic Gardens and Landscapes. In M. Harney (Ed.), *Gardens & landscapes in historic building conservation* (pp. 239–246). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118508107.ch23

Tisi, F. (2006). Making the most of educational experiences in historic and botanical gardens in Trentino. *Informatore Botanico Italiano (Atti "Giardino Storico e Orto Botanico: Un bene culturale al servizio della comunità", Erba 11-12/03/2005)*, *38*(1), 258–264.

Todt, H., Herder, J. G., & Dabija, D.-C. (2008). The Role of Monument Protection for Tourism. *Amfiteatru Economic*, *10*, 292–297.

Torquati, B., Giacchè, G., & Venanzi, S. (2015). Economic analysis of the traditional cultural vineyard landscapes in Italy. *Journal of Rural Studies*, *39*, 122–132. https://doi.org/10.1016/j.jrurstud.2015.03.013

Towse, R. (2002). The cultural economy of heritage. In I. Rizzo & R. Towse (Eds.), *The economics of heritage, a study in the political economy of culture in Sicily* (pp. 3–19). Edward Elgar.

Towse, R. (2019). *A textbook of cultural economics*. (2nd ed.). Cambridge University Press.

Trombino, G. (2018a). La pianificazione paesaggistica. In I. Vinci & P. la Greca (Eds.), *Sicilia: Rapporto sul territorio 2018: Vol. Urbanistica Dossier* (16 ed., pp. 53–58). INU Edizioni.

Trombino, G. (2018b). La pianificazione urbanistica comunale. In I. Vinci & P. la Greca (Eds.), *Sicilia: Rapporto sul territorio 2018: Vol. Urbanistica Dossier* (16 ed., pp. 49–52). INU Edizioni.

Tuan, Y.-F. (1979). Space and place: Humanistic perspective. In *Philosophy in Geography* (pp. 387–427). Springer Netherlands. https://doi.org/10.1007/978-94-009-9394-5_19

Turner, K., Pearce, D., & Bateman, I. (1993). *Environmental Economics: An elementary introduction*. The Johns Hopkins University Press.

Turpie, J., & Joubert, A. (2004). The value of flower tourism on the Bokkeveld Plateau - A botanical hotspot. *Development Southern Africa*, *21*(4), 645–662. https://doi.org/10.1080/0376835042000288833

Ugolini, F., Massetti, L., Calaza-Martínez, P., Cariñanos, P., Dobbs, C., Ostoic, S. K., Marin, A. M., Pearlmutter, D., Saaroni, H., Šaulienė, I., Simoneti, M., Verlič, A., Vuletić, D., & Sanesi, G. (2020). Effects of the COVID-19 pandemic on the use and perceptions of urban green space: An international exploratory study. *Urban Forestry & Urban Greening*, *56*, 126888. https://doi.org/10.1016/J.UFUG.2020.126888

UNESCO (2011). *Recomendation on the Historic Urban Landscape*. https://whc.unesco.org/uploads/activities/documents/activity-638-98.pdf

UNESCO (2015). *Arab-Norman Palermo and the cathedral churches of Cefalú and Monreale*. Nomination File. https://whc.unesco.org/en/list/1487/

UNESCO (2020, October 23). *States Parties*. https://whc.unesco.org/en/statesparties/

UNESCO (2021). The Operational Guidelines for the implementation of the World Heritage Convention, WHC.21/01 (pp. 1–188). https://whc.unesco.org/en/guidelines/

UNESCO (2022). *World Heritage List*. https://whc.unesco.org/en/list/

UNESCO-SCBD Programme (n.d.). *Cultural and Bioligical Biodiversity*. Retrieved February 21, 2023, from https://www.cbd.int/lbcd/

UNIPA (2010). *MOSTRA/"La Zagara" all'Orto botanico | Università degli Studi di Palermo*. https://www.unipa.it/MOSTRA-La-Zagara-allOrto-botanico/

United Nations (2015a). *United Nations Sustainable Development Goals - 11 Sustainable Cities and Communities - Goal 11 Targets*. United Nations Sustainable Development Goals. https://www.un.org/sustainabledevelopment/cities/

United Nations (2015b). Transforming our world: the 2030 Agenda for Sustainable Development. In *Resolution adopted by the General Assembly* (pp. 1–35). General Assembly. https://documents-dds-ny.un.org/doc/UNDOC/GEN/N15/291/89/PDF/N1529189.pdf?OpenElement

United Nations Economic and Social Council (2020). *Sustainable Development*. https://www.un.org/ecosoc/en/sustainable-development

UNTWO (2020). *World Tourism Barometer May 2020 special focus on the impact of COVID-19*. https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2020-05/Barometer_May2020_full.pdf

Urban Forestry & Urban Greening (n.d.). *About this journal*. Retrieved November 24, 2020, from https://www.journals.elsevier.com/urban-forestry-and-urban-greening

US/ICOMOS (2004). *Natchitoches Declaration on Heritage Landscapes*. US/ICOMOS. https://usicomos.org/wp-content/uploads/2019/12/213natchitoches.pdf

Valente, D., Pasimeni, M. R., & Petrosillo, I. (2020). The role of green infrastructures in Italian cities by linking natural and social capital. *Ecological Indicators*, *108*. https://doi.org/10.1016/J.ECOLIND.2019.105694

Valletta Convention on the Protection of the Archaeological Heritage (1992). European Treaty Series, no. 143. https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=143

Van Berkel, D. B., Tabrizian, P., Dorning, M. A., Smart, L., Newcomb, D., Mehaffey, M., Neale, A., & Meentemeyer, R. K. (2018). Quantifying the visual-sensory landscape qualities that contribute to cultural ecosystem services using social media and LiDAR. *Ecosystem Services*, *31*, 326–335. https://doi.org/10.1016/J.ECOSER.2018.03.022

Venturi Ferriolo, M. (1989). *Nel grembo della vita : Le origini dell'idea di giardino*. Guerini e associati.

Vergou, A., & Willison, J. (2016). Relating social inclusion and environmental issues in botanic gardens. *Environmental Education Research*, *22*(1), 21–42. https://doi.org/10.1080/13504622.2014.984161

Viola, A., & Speciale, M. (2021). Palermo: Il grande sperimentatore. In A. Viola & M. Speciale (Eds.), *Andare per Orti botanici*. il Mulino.

Vissac, C. (2005). Study of a historical garden soil at the Grand-Pressigny site (Indre-et-Loire, France): Evidence of landscape management. *Journal of Cultural Heritage*, *6*(1), 61–67. https://doi.org/10.1016/J.CULHER.2004.07.002

Wahurwagh, A., & Dongre, A. (2015). Burhanpur cultural landscape conservation: Inspiring quality for sustainable regeneration. *Sustainability*, *7*(1), 932–946. https://doi.org/10.3390/su7010932

Wales, N., Murphy, R. J., & Bruce, E. (2020). Understanding patterns of vegetation change at the Angkor World Heritage site by combining remote sensing results with local knowledge. *International Journal of Remote Sensing, 42:2, 445-468*. https://doi.org/10.1080/01431161.2020.1809739

Ward Thompson, C., Roe, J., Aspinall, P., Mitchell, R., Clow, A., & Miller, D. (2012). More green space is linked to less stress in deprived communities: Evidence from salivary cortisol patterns. *Landscape and Urban Planning*, *105*(3), 221–229. https://doi.org/10.1016/J.LANDURBPLAN.2011.12.015

Wen, C., Albert, C., & Von Haaren, C. (2022). Nature-based recreation for the elderly in urban areas: Assessing opportunities and demand as planning support. *Ecological Processes*, *11*(1), 44. https://doi.org/10.1186/s13717-022-00390-0

WHO (2020, June 29). *Listings of WHO's response to COVID-19*. https://www.who.int/news/item/29-06-2020-covidtimeline

WHO Regional Office for Europe (2017a). *Urban green spaces: A brief for action*. https://www.euro.who.int/__data/assets/pdf_file/0010/342289/Urban-Green-Spaces_EN_WHO_web3.pdf

WHO Regional Office for Europe (2017b). *Urban Green Space and health: Intervention impacts and effectiveness*. https://www.euro.who.int/__data/assets/pdf_file/0007/338074/full-report-for-archiving.pdf

Willis, K. G. (1994). Paying for heritage: What price for Durham cathedral? *Journal of Environmental Planning and Management*, *37*(3), 267–278. https://doi.org/10.1080/09640569408711975

Willison, J. (2013). First word: Our audience keeps us real and relevant. *Roots - Botanic Gardens Conservation International Education Review*, *10*(2), 2–5. https://www.bgci.org/wp/wp-content/uploads/2019/04/Roots_10.2.pdf

Wirtz, J., Holmqvist, J., & Fritze, M. P. (2020). Luxury services. *Journal of Service Management*, *31*(4), 665–691. https://doi.org/10.1108/JOSM-11-2019-0342/FULL/XML

Wise, S., & Craglia, M. (2007). Preface. In S. Wise & M. Craglia (Eds.), *GIS and evidence-based policy making* (pp. ix–xvi). CRC Press.

https://doi.org/10.1201/9781420008234/GIS-EVIDENCE-BASED-POLICY-MAKING-MAX-CRAGLIA-STEPHEN-WISE

Wolch, J. R., Byrne, J., & Newell, J. P. (2014). Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough.' *Landscape and Urban Planning*, *125*, 234–244. https://doi.org/10.1016/J.LANDURBPLAN.2014.01.017

Wood, S. A., Guerry, A. D., Silver, J. M., & Lacayo, M. (2013). Using social media to quantify nature-based tourism and recreation. *Scientific Reports 2013 3:1*, *3*(1), 1–7. https://doi.org/10.1038/srep02976

World Commission on Environment and, & Development (1987). Report of the World Commission on Environment and Development: Our common future towards sustainable development. https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf

World Heritage Convention (1972). UNESCO *Convention Concerning the Protection of the World Cultural and Natural Heritage*. https://whc.unesco.org/archive/convention-en.pdf

Yeh, C. C., Hua, K. T., & Huang, C. H. (2016). Service quality improving effects and recreational benefits for sports tourism - a case study. *Tourism Economics*, *22*(6), 1332–1337. https://doi.org/10.1177/1354816616672357

Yeh, C. C., Lin, C. S., & Huang, C. H. (2018). The total economic value of sport tourism in belt and road development-an environmental perspective. *Sustainability*, *10*(4). https://doi.org/10.3390/SU10041191

Zangheri, L. (2009). Documenti, esperienze e strumenti di conservazione: Bilancia a 25 anni dalle Carte di Firenze. In L. S. Pelissetti & L. Scazzosi (Eds.), *A 25 anni dalle Carte di Firenze: esperienze e prospettive: Vol. I* (pp. 167–169). Leo S. Olschki.

Zopiatis, A., & Melanthiou, Y. (2019). The celebrity chef phenomenon: A (reflective) commentary. *International Journal of Contemporary Hospitality Management*, *31*(2), 538–556. https://doi.org/10.1108/IJCHM-12-2017-0822

Zuelow, E. G. E. (2016). *A History of Modern Tourism*. Macmillan Education UK. https://doi.org/10.1007/978-0-230-36966-5