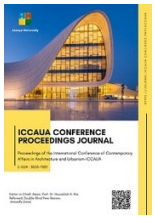

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Greening Heritage: Sustainable Interventions in the Historic Center of Naples

* Dr. **Amira Hamdy El. Sayed Abdou**

Lecturer of Interior Architecture, Faculty Of Arts and Design, Pharos University in Alexandria, Egypt

E-mail: amira.hamd@pua.edu.eg

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A b s t r a c t

The historical center of Naples is the epicenter of about three millennia of architecture, culture and urban development; being a UNESCO World Heritage Site. Though a lot of research has been done over its architectural and cultural values, still, there is a lack of light when it comes to the purpose of green spaces in such a densely built-in society and how much they contribute to the well-being of the community, how their presence is linked to environmental sustainability, and spatial resilience. This paper fills this vacuum by focusing on spatial and environmental features of historic center of Naples to assess the scope of introducing green infrastructure to the existing urban setting. The investigation of means of revitalizing the historic center is carried out using a multi-methodological approach to reach experimental Temporary Landscape interventions. The work highlights short-term actions that improve the resilience of the environment and improve social life without damaging the cultural heritage, architectural designs, and values of the community by providing a replicable framework to other urban centres in the same situation.

K e y w o r d s : Naples; sustainable urban design; green infrastructure; heritage preservation; resilience; temporary interventions

1. Introduction

Naples historic center is one of the main European heritage sceneries, the symbol of centuries of intercontinental influencing, construction stratification and urban modernization (De Rosa etal., 2013). Listed as one of the UNESCO World Heritage Sites, its congested nature is a cultural heritage, as well as sustainability problem. In modern cities, green infrastructure is being used as a tool to make the urban environment livable and resilient, but in the context of heritage, such changes are not easily received given protection views on such additions in the city (Pane, A. 2023).

Although there has been a lot of studies on architectural and socio-cultural identity of Naples, there is no precedent on how sustainable landscape strategies can be implemented in Naples historic core (CIRILLO et al., 2021). eventhough European cities such as Barcelona and Lisbon have experimented with temporary greening, few studies systematically examine how these interventions function within UNESCO heritage contexts (Rössler, M. 2006). Naples historic core is a dense built-up area with a rich cultural heritage that is celebrated but has experienced growing population, as well as a shortage of green infrastructure (Rossi, U. 2004). The previous knowledge on the subject has focused more on architectural and cultural value of the location whereas relatively less had been done in integrating a sustainable landscape approach in such a history-rich setting . This disconnect underlines the necessity to investigate how one may make ecological and social positive change without affecting the loss of cultural authenticity (Ribera et al., 2020).

The purpose of this research is therefore to introduce and test temporary green solutions with a sustainable effect that are relevant to environmental issues, as well as the well-being of communities, and conserve the historical context of the centre of Naples (Fabbricatti et al., 2019). This study contributes by filling this gap in the case of Naples. This study is aimed at examining the spatial and the environmental issues of the historic center of Naples and suggesting temporary green interventions in the framework to incorporate green infrastructure into heritage urban settings (Rossi, U. 2004).

A multi-method case study approach was adopted. Through Qualitative and Quantitative analyzation, Many significant places are covered in this study, for example, Piazza Carità, Giardini del Molosiglio, Chiesa dei Santi Marcellino e Festo (Mazzeo, G. 2009). They were picked because of their historical value and how different

amounts of green space are present in each area. On-Site Observations will spot the notes which reflect pedestrian dynamics, thermal comfort, and current green infrastructure. Data obtained by interviewing the locals, business owners, and municipal planners to acquire their perception of green interventions (Gullino et al., 2013) will help to achieve the Experimental Simulations through 3D rendering/ scenario design prototypes of possible interventions to check spatial compatibility and come up with design proposals that assess sustainability, cultural preservation, and social acceptance (Mariani et al., 2020).

To support the research, a literature review was carried out to place this study in the wider scholarly discourse, four key themes are going to be identified in the literature review. Firstly, how urban green infrastructure may contribute within historic cities by taking a global perspective to provide examples of both the opportunities and limitations (Lafortezza et al., 2013). Secondly, the study will also look at the emerging literature on interventions and temporary occupation of urban space to see it as a revitalization provision (Grodach et al., 2015). Thirdly, the study will consider sustainability and resilience schemes, especially the ones associated with the UN Sustainable Development Goals, biophilic design, and climate adaptation care (Cacique et al., 2022; Fabbricatti et al., 2019). Lastly, it will state the convoluted interactions between the community well-being, as well as heritage preservation, and the necessity to achieve a better balance between the ecological positive and cultural survivals (Beatley et al., 2013). The combination of these themes can be considered the already existing conceptual basis of evaluating the possibilities of temporary, green interventions in the historic center of Naples.

The study supports the idea that use of pedestrian-friendly buildings and community participation in landscaping can help the historic center become more pleasant and resistant to changes (Lafortezza et al., 2013). This approach combines protecting the city's heritage, promoting eco-friendly design, and making cities sustainable, bringing a new idea to the historic centers of Naples (Cacique et al., 2022). As it unites the practices of past and contemporary urban planning, the study contributes with renewing Naples in a sustainable way and supports cities facing similar situations across the globe.

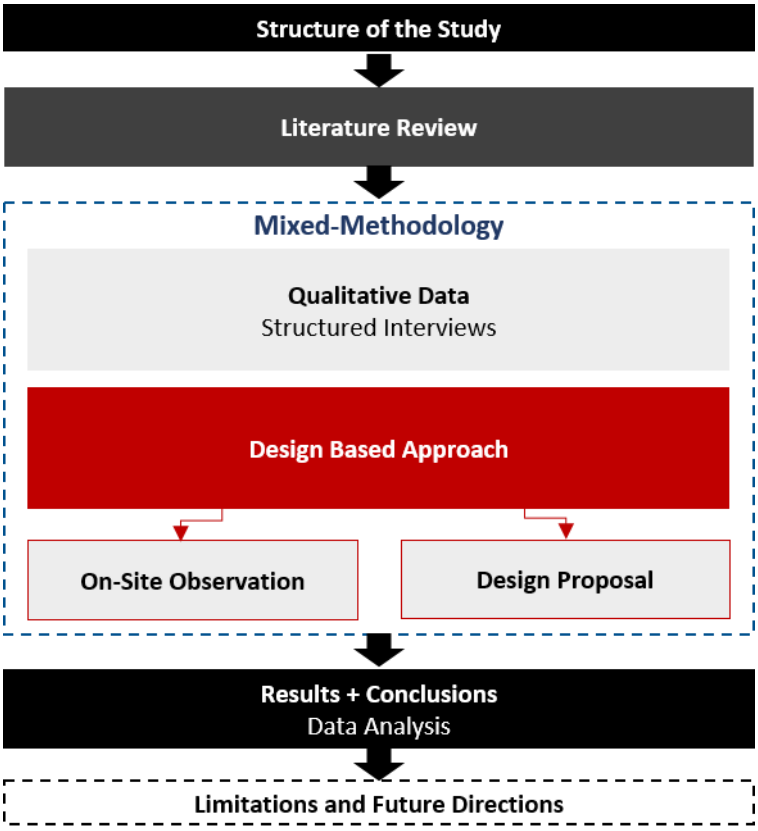


Figure 1. Structure of the Study (Developed by Author).

2.0 Literature review

Such sites as the UNESCO part of Naples demonstrate the combination of both cultural heritage and architecture within an evolving city culture. Previous Studies on literatures have only been keen on preserving architectural heritage (Penića et al., 2015; UNESCO, 2016) without making any correlation to the eco-friendly and flexible developments.

The UNESCO-listed urban site in Naples combines the history of the territory (Di Giovine, M. A. 2008), architecture, and modern changes in the city. There exists a range of studies written to describe the ways of preserving architecture, but less can be found that relate to the improvement of the environment and adaptation of places with the help of green design interventions (swensen et al., 2020; Green et al., 2016). Four of the most prominent theories are used in the review: Urban green infrastructure in historic centers, Temporary urban interventions (e.g., tactical urbanism, pop-up parks), Sustainability & resilience frameworks (UN SDGs, biophilic design, climate adaptation), and Community well-being and heritage preservation balance. Such frameworks are

indicative of an elaborate solution to initiating environmental improvements in historical cities involving maintenance of traditional charisma, architectural distinctiveness and social necessities, see Figure 2.
All these frameworks are used to develop a practice-oriented approach to green infrastructure utilization on the grounds of a comprehensive and practical approach to high considerations of green infrastructure in historical cities (Ahren, J. 2007). Therefore, this review corroborates the design-thinking trends of the present study in that it weighs lightweight, flexible, and eco-friendly designs which aim to enhance living in Naples but do not jeopardize the spirit of the city (Cacique et al., 2022).

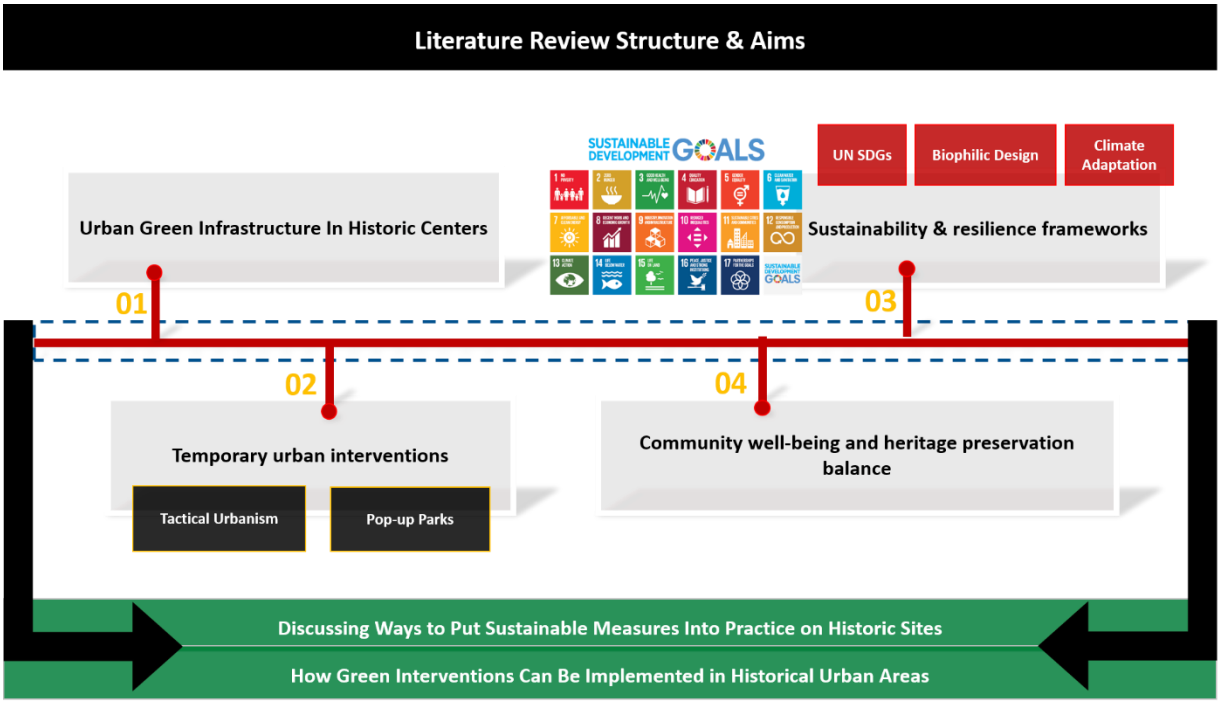


Figure 2. Literature Review Structure & Aims (Developed by Author).

2.1. Urban Green Infrastructure (UGI) in Historic Contexts

The notion of Urban Green Infrastructure (UGI) has become a topic of the substantial importance as the urban resilience builder, as the microclimate improver, and as the well-being provider of communities in the modern cities (Cameron et al., 2012). Heritage cities are however fraught with peculiarities because of their small-scale urban forms, and constraints of preservation. Research on the historic central areas of Milan notes that it is common that the large-scale greening initiatives, including green corridors or new parks, simply are unsuitable in the dense built-up spaces (Warke et al., 2025; Dogan et al., 2023), see picture 1. Scholars have called instead of adaptive reuse of inner courtyards and residual void, viewing them as potential opportunities to add greening, without destroying cultural fabric, and incorporating eco-friendly advantages, see Picture 2. Such an approach focuses more on accessibility than on quantity: small-scale, distributed intervention measures can have a significant effect on resilience, as long as they are strategically placed and accessible to all people (Van Oijstaeijen et al., 2020; Pauleit et al., 2019).

Picture 1. Shows the historic central areas of Milan including green corridors
Source: Warke et al., 2025

Picture 2. Shows the adaptive reuse of inner courtyards to add greening, eco-friendly advantages.
Source: Dogan et al., 2023

Parallel to this is the recently emerged idea of Urban green heritage that as a concept considers green elements as a part of heritage (Rossi, U. 2004; Cameron et al., 2012), as shown in picture 3. In addition to viewing trees, gardens, or courtyards as secondary, scholars suggest that they should be treated as living cultural assets, which would allow managing them in a way that does not decline with the city and yet keeps the sense of continuity with past identity (Borreani, F. 2023). This rethink places green spaces no longer as optional environment-friendly add-ons but as fundamental determinants of cultural and ecological heritage of a city. Considered as a whole, this body of literature indicates that UGI in heritage districts should be applied in a scalable and context-sensitive manner, that is: aim at fine-grained, temporary, and socially sensitive greening (courtyards, pocket insertions, rooftop and facade planting) and strive to increase thermal comfort and well-being without violating cultural authenticity (Grodach et al., 2015).

Picture 3. Shows the Urban green heritage of Naples, Italy
Source: Rossi, U. (2004)

2.2. Temporary and Tactical Interventions in historic centers

Temporary interventions in the city have become an evolving strategy to make best-use of high-density urban areas with minimal displacement of residents. These implementations are often called tactical urbanism and can include low-budget, short-term, and temporary tactics such as pop-up parks, modular gardens, and pedestrianized streets (Lydon & Garcia, 2015). These interventions are also platforms of experimenting design solutions, engaging the community in taking part and creating change inclusive of minor modifications (Finn, 2014). In heritage contexts, such a temporary and reversible nature directly contributes to their relevance since they are in line with preservation restrictions, yet they add ecological and social advantages (Russo, 2020). Where there is little space and the heritage rules are constraining, tactical and temporal solutions present exciting options. The short-term, low-cost, and community-based actions like pop-up parks or modular gardens also known as tactical urbanism have seen increased popularity as a strategy of trying the strategy before its official incorporation (Uršič, et al., 2025). It is argued that historic centers can serve as a great laboratory in which such interventions can take place with the co-planning, self-construction, and co-operation processes becoming the means of empowering local communities and producing the forms of resilience embedded socially (Manzo et al., 2006). Such approaches correspond to the adaptive logic of heritage settings: all interventions can be reversed and easily modified, allowing minimal effects to be exerted on the cultural authenticity in addition to offering tangible environmental and social advantages (Tzoulas et al., 2007).

Picture 4. Shows the Tactical Intervention of University of Tennessee, Nashville
Source: Lydon & Garcia, 2015

Picture 5. Shows the Tactical Urbanism in Piazze Aperte, Milan, Italy
Source: Lydon & Garcia, 2015

2.3. Sustainability and Resilience Frameworks

The implementation of sustainability and resilience models is playing a major role in defining urban transformation agendas. The United Nations Sustainable Development Goals (SDGs) such as Goal 11 on sustainable cities and communities have highlighted the concerns related to building inclusive, safe, and resilient urban environments (United Nations, 2015). Complementing this theory, the biophilic design theory postulates the inclusion of natural elements in the built environments to enhance human health, productivity, and performance in a certain ecological condition (Beatley et al., 2013; Kellert, 2008). In rhetoric about climate adaptation, the concept of resilience

promotes the application of micro-scale solutions-like permeable surfaces, pocket gardens, and green façadesistry as a measure to overcome urban heat islands and flood risk challenges (Meerow et al., 2016). These frameworks in combination give an understanding on how it is possible to incorporate sustainable, small-scale intervention into historic situations (Smith et al., 2000), see figure 3

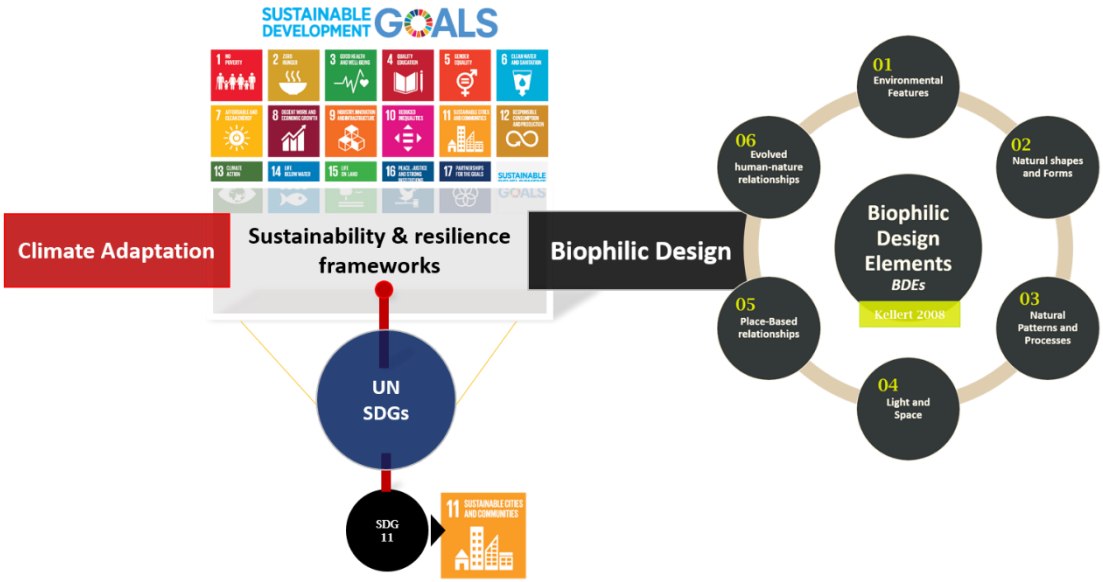


Figure 3. The Sustainability and Resilience Frameworks of the Study (Developed by Author).

Sustainable Heritage Conservation shares the concept of cooperation between conserving the past and embracing environmentally sustainable concepts. Subnature and attributes great prominence to such elements of the city as air, water, and vegetation that are due to be celebrated (Carr, S. J. 2014). By taking sustainable means which can be easily reverted or corrected, the city of Naples preserves its famed architecture and contributes to solving certain acute issues, both environmental and health based (Cacique et al., 2013).

The debate on conservation of heritage and sustainability highlights the issue when the cities attempt to preserve their old characters despite the emergence of numerous new demands. According to UNESCO (2016), heritage in the city can only be well preserved when all the factors mentioned are incorporated. The author recommends that wise use of heritage sites and their integration into the environment help the sites continue to develop (Timothy, D. J. 2014). The old town of Naples provides a very good example of the green infrastructure that has been used as far as the preservation of such heritage is concerned (Gill et al., 2007). Transforming courtyards and convent gardens into green ones is perceived as a way to enhance the appearance and the setting of older neighborhoods (Lafortezza et al., 2013). The paper examines the way the methodology of restoration employed on previous cases can be applied to the highly historic areas of the City of Naples (CIRILLO et al., 2021).

2.3.1 Micro-Interventions and Climate resilience

As a consequence of the density of urban morphology, heritage cities are also especially susceptible to climate stresses including heat islands and flooding. As a transferable strategy, the sponge city model achieving permeability, water retention, and small-scale vegetation has received a lot of attention across compact urban contexts (Gill et al., 2007). It is also modular and incremental in its characteristic to make it particularly adaptable to heritage contexts applications where mass infrastructural intervention is not viable (Timothy, D. J. 2014).

Closely related, the OASIS Project in Paris directly addresses this application of micro-intervention in urban thermal comfort by turning schoolyards into “cool islands” in a climate resilient neighbourhood. The project reuses a GIS mapping process, which allows finding the high-potential sites and implementing cost-effective greening of them to maximize social and environmental benefits (Pauleit et al., 2019). Although the Paris case cannot be described as a heritage-specific intervention, the usage of underutilized spaces and the temporary nature of the design elements used to achieve it showcases a strategy applicable to the cities like Naples (De Rosa et al., 2013).

Picture 6. Shows Shows the application of micro-intervention in the OASIS Schoolyard Project in Paris.
Source: Blanc et al., 2025

Picture 7. Shows Shows the intergrating of vegetation in the OASIS Schoolyard Project in Paris
Source: Karam et al., 2022

Picture 8. Shows Shows the maximization of social environmental benefits in the OASIS Schoolyard
Source: Schneider, A. A. (2020)

Picture 9. Shows the implementing cost-effective greening in the OASIS Schoolyard Project in Paris
Source: Blanc et al., 2025

2.4 Community well-being and heritage preservation balance

The historiographical issue in the city centers has always been compromising the well-being of the community with heritage preservation. Researchers claim that the exposure to the green environment positively affects the mental health, strengthens socialisation, and creates a sense of place attachment (Beatley et al., 2013). However, within the context of heritage settings, preventive action needs to be thoroughly planned so that it does not jeopardize culture or architectural integrity (Bandarin et al., 2014). Recently, community involvement and co-management is recognised as paramount to the community being acceptably and socially sensitive in the change interventions (Mariani et al., 2020). When a balance between the positive effect of ecology and the protection of the heritage is created, temporary green strategies can become a mediator between antiquity and modern structure resilience (Fabbricatti et al., 2019).

In addition, Wolch (2014) highlights that well-being in a community improves when walkable, green spaces and interactive public locations are included in urban planning. The idea is to ensure the designs are sustainable and open to everyone, giving people various experiences (Wolch et al., 2014). The analysis of this study involves introducing temporary greenery, which highlights how citizens take part in engaging with it (Rostami et al., 2015; Andersson et al., 2014). In Naples, according to these principles, this study aims to boost greening the historic center, which maintains the city's historical value and builds a pleasant urban environme nt (Grodach et al., 2015; Bandarian et al., 2014).

Picture 10. Shows the walkable, green spaces and interactive public location in Landscape
Source: Mariani et al., 2020

In order to synthesize major key insights to be gained in the literature, four interrelated strands are identified referring to: urban green infrastructure in historic centers, temporal urban experimentation, sustainability and resilience models, and balance between the community well-being and heritage retention. Collectively, these views emphasise the usefulness of tactile, reversible, and socially participatory approaches to sustainable change in heritage cities. Table 1 gives an overview of these themes, their key learnings, the applicability in the Naples case practice and the core sources that gave birth to this research framework.

Table 1. Overview of Literature Review Frameworks (Developed by Author)

Theme	Key Insights from Literature	Relevance to Naples Study
Urban Green Infrastructure in Historic Centers	UGI enhances ecological processes, climate adaptation, and well-being. Historic cores require *fine-grained, context-sensitive strategies* (courtyards, rooftops, façades). Green heritage should be managed as living cultural assets.	Suggests using small-scale, distributed greenery (courtyards, rooftops, façades) in Naples instead of large-scale parks.
Temporary Urban Interventions	Tactical urbanism and pop-up parks are low-cost, reversible, and participatory. Historic centers act as "laboratories" for co-managed, temporary solutions.	Temporary and reversible designs are feasible in Naples' dense, heritage-protected fabric.
Sustainability & Resilience Frameworks	SDG 11 emphasizes sustainable cities. Biophilic design links nature to health and productivity. Climate adaptation calls for micro-scale, modular greening.	Provides theoretical grounding for testing small-scale, resilient green strategies in Naples.
Community Well-Being & Heritage Preservation Balance	Green spaces improve mental health, social cohesion, and place attachment. Heritage requires sensitive, culturally aligned interventions. Community engagement ensures social acceptance.	Balancing ecological benefits with heritage authenticity is crucial for public support in Naples.

3.0 Methodology

3.1 Research design

The paper introduces a qualitative case study research approach and mixed-method research methods with the purpose of analyzing the possibility of temporary sustainable landscape interventions in the old city of Naples. The method of the case study is relevant in that the site in question is a complex World Heritage urban site and requires tackling both social-cultural and environmental aspects.

3.2. Context of the Case Study

Naples historic center was chosen to be studied because its urban density is relatively high and the green infrastructure is barely available and accessible to everyone, and the whole city itself is rich in cultural heritage. It is one of the biggest historic centers preserved in Europe and therefore offers an important testing ground of context sensitive interventions that apply context sensitive measures by attempting to strike a balance between sustainability and preservation.

Picture 11. Shows Piazza del Plebiscito and Castel Nuovo in Naples historic center
Source: italia.it

3.3. Data collection

A multimethod approach to data collection was selected to support the spatial, environmental and social aspect of the historic center of Naples:

3.3.1. On-Site Observation

The current study was carried out through field observation in three significant locations in the zone antica of Naples; Piazza Carita, San Marcellino, and Giardini Del Molosiglio to record the environmental and spatial aspects within them, as shown in figure 4. These observations presented a starting point interpretation of what was already there as environmental challenges and scope of greening.

Although these places are of cultural value and part of UNESCO-preserved structure, they simultaneously evoked common issues: lack of vegetation, large numbers of pedestrian traffic and the exposure to hot weather and air contamination. Architectural and spatial evaluation indicated that the presence of narrow streets, paved courtyards, and vacant squares did not provide much shade or ecological shelter, and therefore supported the expressed need of the community to have greenery. The use of modular installations, vertical trellises, lightweight shading installations and even pedestrian corridors were identified as some of the strategies, which can be used without having to make changes in terms of the historic paving or the historic façades. Critically, these results validate the research gap: there are indeed vast amounts of scholarly attention that have been paid to the maintenance of architectural authenticity in Naples but substantially less attention that has been focused on how temporary, sustainable design intervention could enhance environmental comfort and community well being. The observational analysis thus

formed the contextual background to the experimental simulations that came after, setting the sites to form the test beds of reconciliation of different heritage preservation and ecological resilience, see figure 5.

Figure 4. On-Site observation in three significant locations in the zone antica of Naples; Piazza Carita, San Marcellino, and Giardini del Molosiglio to record the environmental and spatial aspects within them (Developed by Author, The maps were created by the authors using Google Earth).

Figure 5. On-Site observation Piazza Carita, San Marcellino, and Giardini del Molosiglio environmental challenges and scope of greening (Developed by Author)

3.3.2. Structured Interview

Individual interviews with local residents, municipal planners, University students, School Students, Scholars and business owners (n = 20) were used in order to obtain a variety of opinions about the role of greenery in the historic center of Naples, as shown in table 2. Participation in interviews was voluntary, and informed consent was obtained by all respondents. The study included data confidentiality and anonymity. The interviews aimed at investigating the feeling of current urban environment, the prospect of preserving the old, and the willingness to accept a temporary and green intervention. The interviews successfully captured both community member and professional stakeholder interventions since the discussions included both community members and professional stakeholders.

Table 2. Structured Interview themes and relavant questions (Developed by Author)

Theme	Interview Questions
Perceptions of Current Conditions	"How would you describe the availability of green spaces?" / "Does the lack of greenery affect your well-being?"

Heritage and Authenticity	"How can greenery be added without compromising historic character?" / "Do interventions risk altering authenticity?"
Environmental Challenges	"What are the main environmental issues (e.g., heat, air pollution)?"
Social and Community Life	"Could greenery improve social interaction in the historic center?"
Temporary Interventions	"Would you support temporary solutions such as modular gardens or pocket parks?"
Community Engagement	"What role should residents and businesses play in planning and maintaining green spaces?"

The interviews have been transcribed and analyzed with the use of a thematic coding method. Feedback was divided into major themes that included the views on current situations, heritage authenticity, environmental issues, social life, interim actions, and community participation. All the themes were used together with the preliminary codes, areas of analytical focus, and anticipated implications (see Table 3). Such systematic procedure made it possible to identify general trends and differences between stakeholder groups and thus making the analysis transparent and repeatable. The resulting thematic framework did not only give a refined view of the priorities of the stake holders, but also reflected in the evaluation criterion applied in simulating the temporary green interventions.

Table 3. Coding Framework for Structured Interview Analysis (Developed by Author)

Theme	Interview Questions	Initial Codes	Analytical Focus	Expected Insights
Perceptions of Current Conditions	"How would you describe the availability of green spaces?" / "Does the lack of greenery affect your well-being?"	Lack of parks, insufficient shade, discomfort, need for nature	Identify gaps in existing urban environment	Evidence of demand for more greenery and its perceived impact on daily life
Heritage and Authenticity	"How can greenery be added without compromising historic character?" / "Do interventions risk altering authenticity?"	Heritage value, authenticity concerns, cultural sensitivity, fear of loss	Balance between cultural preservation and environmental improvement	Clear boundaries for acceptable design interventions
Environmental Challenges	"What are the main environmental issues (e.g., heat, air pollution)?"	Heat stress, pollution, ventilation, lack of biodiversity	Link environmental problems to spatial and health issues	Data to justify climate-responsive greening
Social and Community Life	"Could greenery improve social interaction in the historic center?"	Gathering spaces, social interaction, inclusivity, quality of life	Evaluate potential social benefits	Evidence that greenery fosters community cohesion
Temporary Interventions	"Would you support temporary solutions such as modular gardens or pocket parks?"	Reversibility, flexibility, trial solutions, acceptance	Assess feasibility of tactical urbanism in heritage context	Level of support for low-impact, experimental interventions
Community Engagement	"What role should residents and businesses play in planning and maintaining green spaces?"	Co-management, participation, responsibility, inclusivity	Importance of participatory processes	Framework for community-driven interventions

The qualitative feedback provided by these interviews yielded fairly high reported demand of tighter greening, worries about cultural authenticity, and a general receptivity to short-term interventions as a more agile and less impactful form of revitalization. These insights helped in the designing and validation of the experimental design presentations, which are highlighted in this paper.

3.3.3. Experimental Design Simulations

Based on this analysis, a series of 3D visualizations and even scenario simulations were worked out in order to examine the spatial compatibility and practicality of temporary interventions to historic fabric in Naples, see figure 6. Three exemplary spaces were picked to provide the design proposal case: Piazza Carita, San Marcellino and Giardini Del Molosiglio, all of thinkable high levels of density of urbanity, and high cultural characteristics, and a desert of greenery. The architectural proposals were presented in the variety of architectural interventions: Modular Pocket Parks (Piazza Carita), Pedestrianized Green Pathways (San Marcellino), Vertical and Rooftop Greening (Greening del Molosiglio).

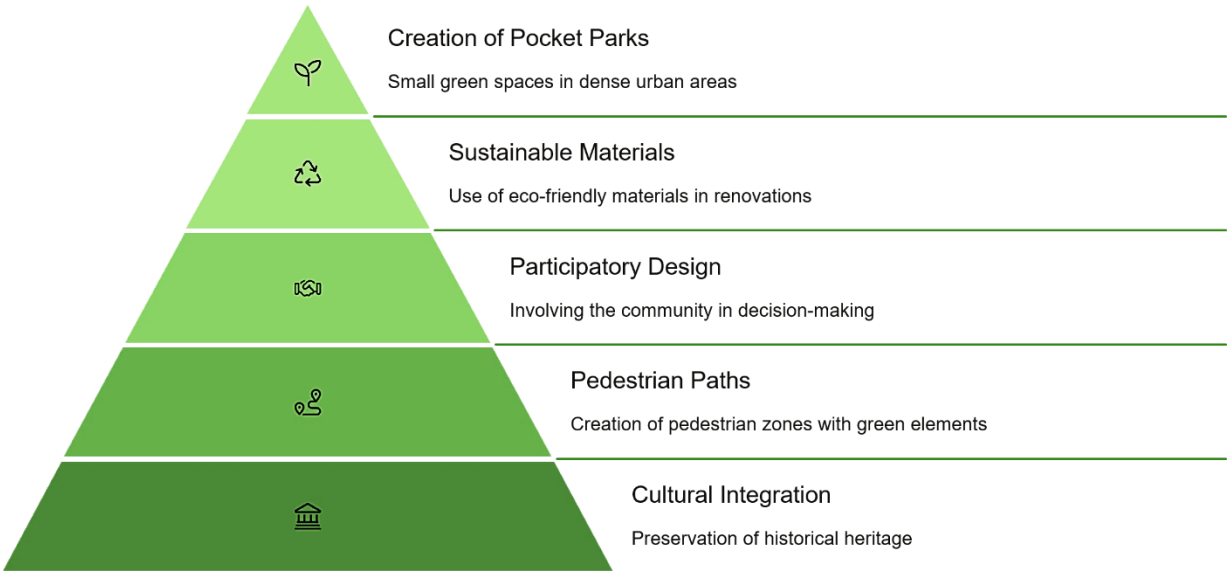


Figure 6. Experimental Landscape Interventions Expected Outcomes (Developed by Author).

In all the locations, experimental simulations have confirmed that temporary, light, reversible and green interventions can be successfully implemented into the compact morphology of the historic heart without destabilizing cultural authenticity. The architectural proposal language, both modular, highly flexible and community-based, was specifically selected to reflect the highly suggested adaptation and replicated character in other similar heritage settings.

3.3.3.1. Conceptual Phase: Inspiration

The idea- and conceptual inception of the interventions is influenced by the playful urbanism experiments by Aldo van Eyck, see figure 7, especially his late war series of playgounds in Amsterdam, where small additions of modular units to abandoned space turned into lively areas of conviviality (Withagen et al., 2017). The frames, climbing structures and geometric shapes he used showed how a few simple elements that are repeated can bring about social interaction and are also context-dependent (Ligtelijn, V. 2019). Applying this philosophy to the city of Naples itself, the design takes on the city landscape, paved piazzas and cloistered courtyards and recreates them as reticular spaces in which reversible and multifunctional interventions can occur. The guiding principle is thus one of modules, ease of playing and dynamicism, so that every component is not an addition to the past but rather an ephemeral and evolving layer onto it.

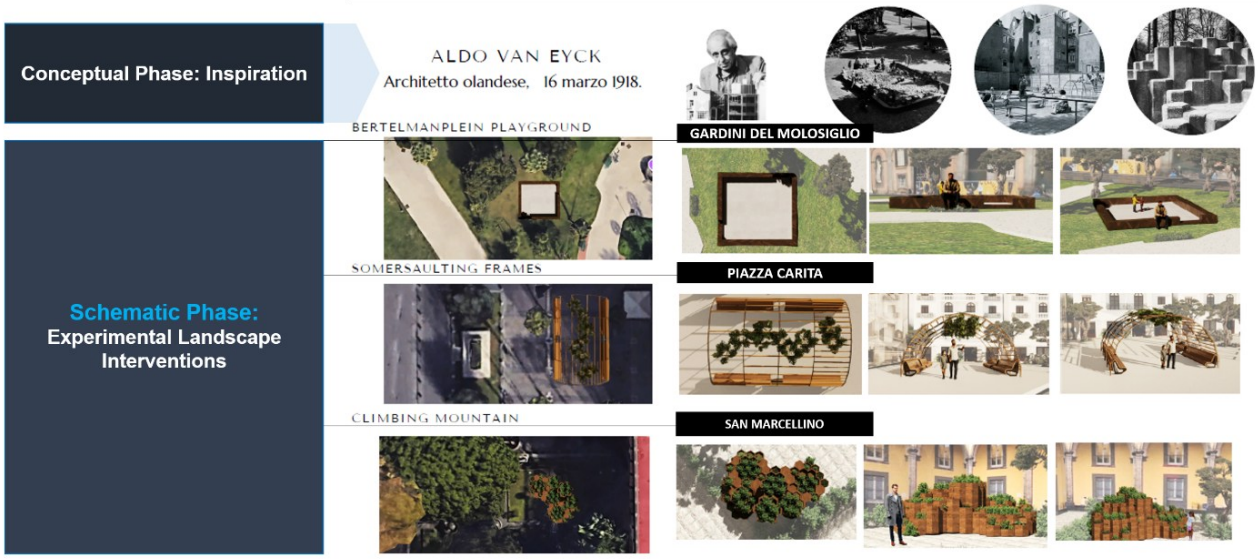


Figure 7. Conceptual Phase of the Landscape Intervention: Inspiration of the Design Proposal (Developed by Author).

3.3.3.2. Schematic Phase: Temporary Landscape Interventions

3.3.3.2.1. Modular Green Canopies and Pocket Parks (Piazza Carita):

One of the most notable historic squares of Naples, the Piazza Caritta is nowadays characterized by poor microclimatic comfort and microclimatic properties, being mostly dominated by hard rock paving, vehicular movements and lack of shadiness, thus badly underutilized by the pedestrians. The approach to the intervention in this case was a transient modular pocket park network integrated with light timber canopies syled after Aldo van Eyck, see Picture 12.

The design proposes modular wooden frames that operate as planters and seating as well as trellis supports. In groups, these elements make corners of the square darkened and semi-closed in their inside and leaving the square being an open one. The climbing vegetation is trained over arched structures that resemble pergolas, to create a pleasant shade that diffuses the roughness of the urban environment and ensures an unobstructed view of the heritage building facades.

Architecturally, the intervention focuses on reversibility and flexibility: modules are prefabricated and weightless activities thus could be rearranged, or dismantled with no anchorages to the paving. Socially, the pocket park approach allows markets, informal gatherings, and the support of local culture because it provides the residents with a movable urban living room to the core of the thick historic fabric.

At the environmental perspective, the addition of shading and planting boosts thermal comfort, the quality of air and the existence of biodiversity reserves in a previously barren region. Culturally, the modular and ill-defined nature of the project can secure that the originality of the square is preserved and that issues of heritage are satisfied, whilst innovative ecological models of city are tried.
Finally, the case study of Piazza Carita shows how a temporary, modular landscape can balance landmark preservation and contemporary urbanist demands, with native locally agricultred plants in the center, see picture 13.

Picture 12. Modular Green Canopies and Pocket Parks in Piazza Carita syled after Aldo van Eyck (Developed by Author).

Picture 13. The geometric language of van Eyck but with native locally agricultred plants in the Landscape Intervention Proposal in Piazza Carita (Developed by Author).

3.3.3.2.2. Pedestrianized Green Pathways (San Marcellino):

This Planning exercise is inspired by the on-going tactical urbanism movement, the temporary pedestrian corridors were simulated with lightweight shading structures and planners, made of modular planters. This intervention formed an extended pedestrian experience that connected landmarks of the culture with alleviating the amount of air pollution and the traffic congestion.
San Marcellino has small-scale cloistered courtyards and a small spatial scale, providing a unique prospect of making micro-scale green interventions. The proposed intervention is a reinterpretation of a leftover hardscape space in the form of stacks of modular planters that create a terraced mountain scape. This results in a three dimensional, climbable topography of vegetation that reminds Aldo van Eyck playground, where geometric groupings were used to encourage both play and contact with others, see picture 14.

The module planters have a simple, lightweight, sustainable material approach architecturally, utilising both soil and plants to fill the structure depending on the season. They are stepped to admit many-layered ground cover up to shrubs within a small area of ground, creating not only a visually rich structure but also ecological assets. The terraced shape is also regarded as an informal seating and gathering area, where people get to interact with vegetation (native locally agricultred plants), see picture 15.

The intervention serves functional purposes, offering a resting shade, a cooling component, and biodiversity shelter, and is likely to do so, as they are sustainable, due to the reversible and modular nature of it, allowing one to chip off, extend or retract, without harming the historic paving and walls underneath. Socially, it functions as a community magnet to ensure that the cloistered yard becomes a green micro oasis that promotes interaction, relaxation and daily use.

Picture 14. Pedestrianized Green Pathways in San Marcellino (Developed by Author)

Picture 15. The terraced shape as an informal seating and gathering area, with vegetation, native locally agricultred plants (Developed by Author)

3.3.3.2.3. Giardini Del Molosiglio -Minimalism on Earth (Greening Del Molosiglio):

Giardini Del Molosiglio is an old landscape in the waterfront, and it is characterized nowadays by under-utilization of lawn, the segmentation of the walkways, and the absence of friendly seating places. The intervention in this case has involved a system of sunken seating frames and planters with a minimalist insertion that is used to integrate the greenery and the social infrastructure. These features are inspired by the geometry playground frames of van Eyck and re-examine the garden as a platform of pause, play, and performance.

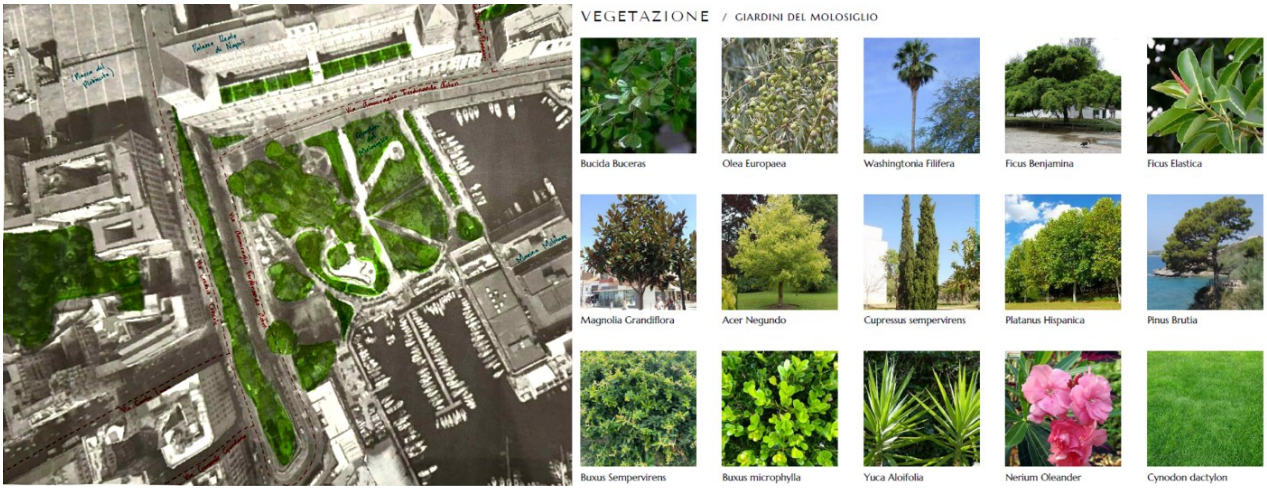
It is rectangular wooden or steel-framed benches that are embedded lightly into the ground plane, the addition of integrated planter boxes chairs that brings the greenery closer to the users. Their low lying geometry adds subtle definition to the space without invading the lightness of the garden. Visitors will be able to sit, recline or interact with each other in a rather informal way, and children and youth will be able to use the frames in order to play, see picture 16. The architectural expression favours resolute pared down aestheticism: straight lines, basic geometries and humble materials would make the architecture visually fitting in the historic context. The structures are temporary and reversible; thus, they increase the comfort of the users and environmental impact with the reversibility of the structures not altering the nature of the historic garden.

Environmentally the intervention will enhance thermo habitability by providing shade and native locally agricultred plants, see picture 17, where the greatest exposure is supposed to take place. Socially, it becomes an enabling place,

which can be utilized in various ways, including rest to minor cultural events, hence resurrecting the garden as living social space.

In the Giardini Del Molosiglio excursion, temporary green infrastructures have been used to reinvent underutilized heritage gardens, establishing a form of ecologically sensitive context-sensitive ecological design that signifies culturally sound infrastructures with the aim of context-specific urban resilience purposes.

Picture 16. The minimalist Landscape Intervention: Greening Del Molosiglio (Developed by Author).



Picture 17. The geometric language of van Eyck but with native locally agricultred plants in the Landscape Intervention Proposal in Giardini Del Molosiglio (Developed by Author).

4.0 Results

4.1. Key Findings

The results of the present study show that short-term greening can be a proper measure to increase environmental comfort, socialization, and heritage-sensitive regeneration in the historical town center of Naples. There were three key insights that were brought out.

Community Perceptions: There was widespread support on restoration of greenery with the interviews showing a support on introducing a low-impact, reversible intervention. The major concerns were on how to maintain the original nature of historic places and ease the livelihood. The interview showed that 80% of the respondents responded that green elements which would be temporary would enhance livability in the historical center. A majority (72%), felt worried that there was a possibility of conflicts with the authenticity of the heritage, and thus reversible solutions were required. While 85% eighty-five percent of people favored the involvement of communities in planning and maintenance of intervention.

On-Site Observation: Field assessment revealed that current circumstances (high population density, a deficiency of on-site shade, exposure to heat/pollution) provided evidence of urgent necessity of micro-based greening interventions.

Design Proposal for Temporary Landscape Interventions: Experimental interventions on the three pilot sites (Piazza Carita, San Marcellino, Giardini Del Molosiglio) demonstrated how a lightweight, modular and flexible infrastructure can lay within a heritage structure without jeopardising any cultural significance or heritage value.

Collectively, these results suggest that short-term landscape interventions provide a transferable framework of heritage protection and sustainable urban transformations.

4.2. Community Perceptions of Green Infrastructure

The data collected during the interviews showed that greenery is highly in demand in everyday life and in many cases the participants complained of the shortage of shade, air impurity, and the lack of an opportunity to go outdoors. At the same time, the respondents also stressed the requirement of an intervention being sensitive to heritage, raising the concern that ill planned greenery could cover over and reduce the historic nature of piazza and streets. This brings out the need to improve ecology and preserve the culture at once.

4.3. Environmental and Spatial Observations

Field notes showed that the physical composition of the historic core was characterized by stone surfacing, windy lanes and a spacious open plaza that increase heat and restrict the movement of those walking on the streets. Restricted natural ventilation in the form of enclosed courtyards was combined with high human density in major squares, which also demonstrated the absence of sustainability structure. Such spatial facts presented crucial data in directing the selection of lightweight, systematic, and reversible design options as to insert greenery without structural imposition.

4.4. Design Proposal Simulations of Landscape Interventions

The testing of the new solutions in Piazza Carita, San Marcellino, and Giardini Del Molosiglio showed that it is possible to implement temporary, rather modular changes that contribute to a higher level of environmental comfort and do not destroy the authenticity of the heritage. At Piazza Carita, shading and a usage conducive to social populated places were advanced by modular pocket parks and trellised canopies. San Marcellino used cluster vertical planting to squeeze a micro-oasis into a cloistered courtyard and Giardini Del Molosiglio transformed underutilized garden edges by resettling spaces with sunken seating frames. The collective designs show how the adaptable, reversible architectural forms, frames, pergolas, and clusters can respond to the environmental requirements and be sensitive to the cultural essence of the historic fabric.

Significantly, the above interventions directly reflect the identified research gap: all the past projects on Naples historic core were focused on architectural and cultural conservation, and hardly anything was mentioned about sustainable landscape strategies. This paper argues that a temporary relational green translates the conflict between preserving the heritage and environmental resilience and presents a portable infrastructure to rejuvenate historic inner-city districts.

5.0 Discussion

The results of this research have significant implications to research as well as practice. On the one hand, they show that modular and short-term green interventions could be a suitable set of instruments to balance environmental comfort and community well-being in historic centers without negatively affecting their cultural authenticity. This implies that heritage preservation and ecological flexibles are not mutually exclusive but can effectively be combined by adopting light weight and reversible approach. Second, the work brings to the field of urban resilience the methodological and finally conceptual links between tactical interventions with large-scale sustainability work including UN SDGs (11). Lastly, the Naples case presents a step-by-step replicable example in other heritage cities across the globe and especially in the Mediterranean region, where overcrowding and lack of green space adds to such susceptibility to climate change.

6.0 Limitations and Future Research

In spite of the contributions that this study has made, there are a number of limitations associated with it. Use of qualitative interviews and simulations implies that the results are just based on perceptions and the ability of designs to work longer term rather than on performance data. The interviewees are numerous but not fully representative of the community of stakeholders especially the marginalized stakeholders whose opinions are usually underrepresented in the urban planning. Also, experimental simulations are still in their rudimentary stages and are not modelled with the detailed environmental performance measures of such factors as evapotranspiration, biodiversity risks or life-cycle costs of materials. Such restrictions point to the importance of using caution when applying results to any setting other than Naples.

Future research should continue to expand on this by developing post- implementation evaluation studies of short-term green interventions to test the long-term effect on the environment and the social benefits. Quantitative approaches like microclimatic measurements, biodiversity census, and user satisfaction surveys may be useful to furnish data to augment qualitative information. Comparative analysis of that across cities with varying histories would also enhance an understanding of the effects of cultural, climatic, and regulatory conditions of the success of temporary interventions. Lastly, co-management models-where residents, businesses, and municipalities are able to combine and manage the co-existence of green infrastructure temporarily-would further help in determining how to make the most of sustainability, participation, and resilience in heritage-sensitive locations.

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Conflict of Interests

The Author declares that there is no conflict of interest.

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