Downscaling NUA: Matera New Urban Structure

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Abstract. Downscale implementation of National Urban Environmental Technician (NUA) principles is an emerging topic in sustainable territorial development. The approach has several advantages over traditional urban regeneration strategies, including a comprehensive view of problems and solutions, a rational process to verify logical connections, and a reference matrix based on NUA principles to measure impacts and results. The research focuses on laboratory design practice results based on "age responsive planning" and "Child responsive" urban planning, which aim to improve the safety and well-being of young people in urban areas. A group of students in an Urban Planning course selected measures to enhance urban fabric components such as green spaces, unused buildings, and pedestrian safety near schools. The study provides a draft master-plan for Matera's future, contributing to the "Child responsive" urban planning debate and supporting cultural and tourism development. The study offers advantages over traditional urban regeneration approaches and contributes to developing tools and methodologies for NUA downscaling at the local level, integrating innovative technologies and thematic urban design components.

Keywords: New urban Agenda 2030 · Sustainability · Urban design

1 Downscaling NUA

The New Urban Agenda (NUA) [1] is a widely recognized concept that has led to the development of new agreements among major stakeholder groups involved in urban planning and territorial management. The NUA is linked to global sustainability targets, which has resulted in a new form of commitment in public decision-making [2]. According to the United Nations, the NUA is a global commitment to promoting sustainable urban development and ensuring that cities and human settlements are inclusive, safe, resilient, and sustainable. The NUA is the result of a negotiation process involving various stakeholders, and it aims to address global issues by generating local innovations in urban management practices.

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Scaling down the NUA principles and objectives to specific study areas is an ongoing process and one of the emerging topic for urban studies. Actually, it has not yet a comprehensive conceptualization including pre-designed procedures or rules. This has resulted in varying approaches in different case studies. However, recent studies conducted at the University of Basilicata in Italy showed that teaching sustainable development requires more and different tools, particularly in academia [3, 4]. The study involved students developing a project in Matera (EU Capital of Culture 2019) [5] that assessed the compliance of NUA principles in a specific sample area. The project titled "Matera new urban structure" analyzed the implementation of the principle of "AGE RESPONSIVE PLANNING," identified gaps and problems, and proposed design hypotheses to improve the situation. This principle is included in the dimension of Social Sustainability and represents a challenging topic that opens urban studies towards new design perspective applied to the city of the future.

The results of the study demonstrated the effectiveness of an academic teaching approach on scaling down NUA' principles and provided a preliminary structure for developing new tools to reinforce the new generation of territorial technicians, particularly engineers and architects. In conclusion, this paper highlights the key arguments and recommendations for future applications of the NUA in urban planning and territorial management [6].

2 Background and Scope of the Research

The adoption of SDGs by the UN has mainstreamed the concept of sustainable development in public policy making. The SDGs are a set of 17 global goals, with 169 targets, aimed at ending poverty, protecting the planet, and ensuring peace and prosperity for all. SDG 11 focuses on making cities and human settlements inclusive, safe, resilient, and sustainable. The SDGs provide a framework for action on sustainable development, promoting the integration of economic, social, and environmental policies.

Together with the diffusion and implementation of the SDGs, a new demand for education at all levels has emerged to verify the adequacy of current tools and approaches to meet the demands posed by the new global goals.

This statement highlights the importance of education and training to ensure that the implementation of the SDGs is successful. The United Nations recognizes the importance of education in achieving the SDGs and has made it a target under Goal 4: Quality Education. The report "Education for Sustainable Development Goals: Learning Objectives" by UNESCO provides guidelines for educators to incorporate sustainable development into their teaching practices. Additionally, "Transforming our world: the 2030 Agenda for Sustainable Development" outlines the importance of education as a means to empower individuals and communities to achieve sustainable development.

Teaching sustainable development needs more and different tools and a specific need emerges in academia, especially for those disciplines based on strong technical backgrounds. In fact, the traditional disciplinary approach to urban planning and territorial management is almost insufficient to address the complexity and interdependence of economic, social, environmental and spatial issues. The transdisciplinary approach, at the bases of former approaches, has to be re-oriented in order to better integrate knowledge

domains including those specific contributions generated through the active participation of stakeholders. Furthermore, teaching sustainable development requires the adoption of critical thinking, ethical values, and practical skills [3].

The topic of downscaling NUA principles and objectives is still an open topic. The NUA is a global framework, and its principles and objectives need to be adapted to the local context. However, no pre-designed procedures or rules have been conceptualized. Single case studies produce different approaches, reflecting the diversity of local conditions and stakeholders. Therefore, a bottom-up approach, based on the participation of local communities and stakeholders, is needed [7–12]. Furthermore, the downscaling process requires the integration of different knowledge domains and the development of new tools and methods.

Young territorial technicians, such as Engineers and Architects, have the opportunity to gain competitiveness and readiness to develop solutions to the emerging problems in urban and territorial sustainable planning, by experimenting in practice the design of urban transformations by the lens of NUA [3, 4, 13].

The experience of this research benefits a peculiar case study area: the city of Matera. This specific and unique context is an UNESCO site and a city selected as EU Capital of Culture in 2019 [5, 14]. A place where the beauty of urban form, the valuable landscape, the current extreme tourism development conflict with the demand for economic development of the South Italy area and social concerns never solved by the local governments.

In particular the focus of the study is to verify the level of compliance of the "urban structure" with NUA specific objectives. We refer to "Urban structure" as the physical and social arrangement of a city, including its built environment, transportation networks, open spaces, and land uses. It encompasses the spatial organization of the city's various components and how they relate to each other. The urban structure of a city can have a significant impact on its livability, sustainability, and economic vitality. An effective urban structure can support a high quality of life for residents, promote efficient use of resources, and facilitate economic growth and development.

Those traditional urban development focuses have to be balanced, in the case of Matera, with the tourism specialization of the city and the way in which such specialization could be balanced with surrounding territory distributing added value and ensuring sustainable tourism pressure [10, 15–17].

3 The Case Study and the Target

According to the New Urban Agenda, it is necessary to foster a new path of sustainable urban development to improve the citizens' live according to social, economic, environmental and spatial dimensions. In a historical phase in which it is asked to work in territories in ecological, economic and social transition, it is necessary to find the ability to work in a context of consultation with local governments for the promotion of integrated actions, oriented to the energy transition and the fight against social inequalities to spread awareness and orient local communities towards new and complex paths of sustainability. Today, sustainability is the thickest lens through which urban planning is called to respond to change [13, 18], and the contamination capacity of this discipline

allows for a deeper look at the question of responsibilities, skills and useful tools to address the challenges launched by the SDGs, starting with Goal 11 "Making inclusive, safe, durable and sustainable cities and human settlements," but expanding the reflection to the broad interconnections between all the goals [19].The target audience for the case study is "age responsive planning," i.e., planning for an age group between 3 and 27 years old, according to the "universal right to education" principle to support the right to quality education and counter the phenomenon of school dropout in the youngest age groups, considering also that knowledge and competence for high levels of education are crucial for entering the working world and determining one's future. The "Child responsive" principle highlights the need to ensure the safety and well-being of young people in urban planning. In order to implement this target, an area with a high concentration of educational institutions of all levels was selected, stretching from the center to the south of the city of Matera, from Piazza Matteotti with the central train station to the Lanera district to the south of the city, one of the historic districts created as a result of Law No. 619 of May 17, 1952, "Risanamento dei rioni Sassi nell'abitato del Comune di Matera." Matera became in those years, thanks to the contribution of great architects and town planners, such as Adriano Olivetti, Luigi Piccinato, Ludovico Quaroni, the

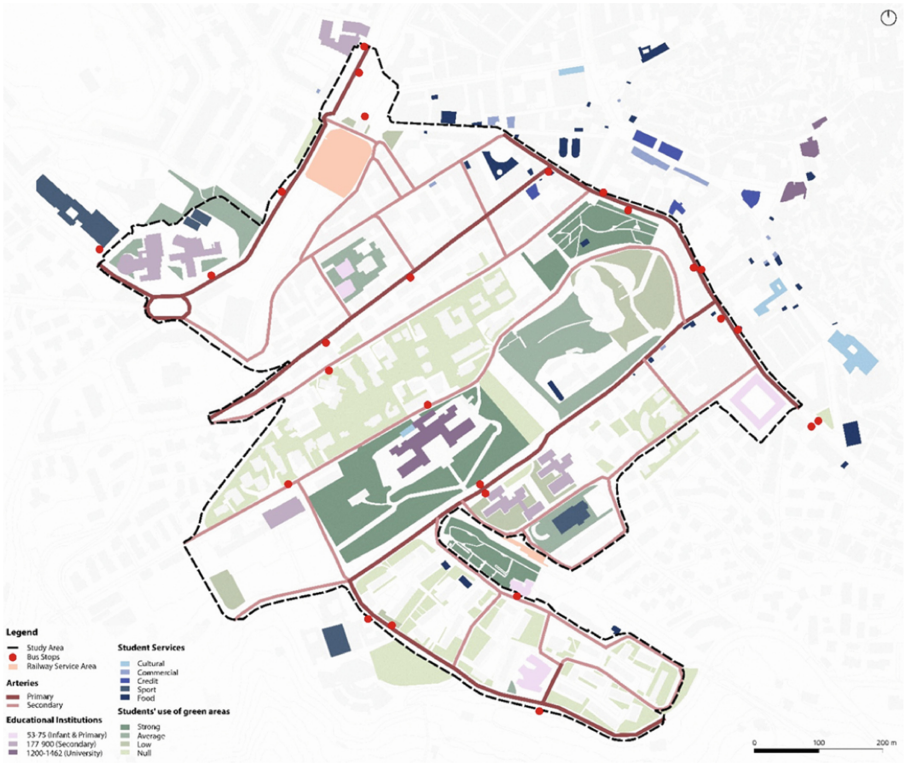

Fig. 1. Study area with indication of the green system, the education system, the mobility system and the service system for students.

center of experimentation of a new way of doing architecture, a new way of thinking of a city capable of taking into account the socio-economic peculiarities of communities and above all the wealth of millenary history, together with the customs and traditions of individuals. As in the past, Matera could become a laboratory of policies to help understand what the role of a medium-sized European city can be, whether the heritage of a city still has the capacity to structure larger territories, whether urban space can once again become a form of citizenship, conceived as an incubator of the city's civic value, and whether this value can be made legible in urban design and its forms [14]. It is therefore useful to define, as shown in the state of the art map, the urban framework, that is, the set of infrastructures (equipment, services and facilities) designed to meet the needs of the population settled in an urban area, in terms of education, health, leisure, transport, etc. Analyses were conducted on the basis of: - the green system with classification based on youth use; - the mobility system with main and secondary arteries and urban and suburban public transportation service with the identification of different stops and stations for buses and trains; - the education system with classification according to different grades (infant and primary, first and second level secondary school and university) and student enrollment numbers; - the system of student services (cultural, commercial, sports, etc.) (Fig. 1).

The area is crossed by several main roads, such as Aldo Moro, Lucana, Lanera and Carlo Levi streets, which are characterized by heavy traffic especially in certain parts of the day and in the proximity of educational institutions. In Lanera street there is the University of Basilicata, the High school "Tommaso Stigliani" and the "Emanuele Duni", the secondary school "Nicola Festa," and also in the same neighborhood the primary school "Padre Giovanni Semeria" and "Minozzi." while in Aldo Moro street the High School "Dante Alighieri" and "Loperfido - Olivetti" and the primary school "Francesco Torraca". Transportation service for students is provided by 15 urban lines that run through the area and for commuters by three suburban bus lines and the presence of two Interregional railways (FAL) train stations (center and south). The number of university and secondary school students far exceeds that of primary and kindergarten students, as students residing in the city are joined by commuter students from neighboring municipalities. The high heterogeneity of children's ages allows for reflections on the different latent needs of children [20].

There is a high presence of green areas, some of which are also poorly developed and frequented, and a scarce presence of services that can be reached, instead, in the neighboring central areas. It can be said that the area in an elevated position on one of the city's highest hills, along the western ring road and close to the Castle hill, has great potential to be exploited with new planning, the redevelopment of green areas, the securing of the road system and the equitable distribution of services to improve the experience in these places and make students conscious citizens in the process of participation and redevelopment of the urban framework.

4 Urban Planning Framework: An Institutional Care

The objectives of the NUA fit together with the urban analysis of a specific context where, through the reconstruction of the dynamics affected by users and the mapping of services and mobility, critical issues related to the sensitivity of places emerge with particular attention to collective life. Main critical urban fabric categories that emerged according to the study area analysis:

- Unused buildings, closed to public schools and other educational centers.
- The uncomplete university campus still missing the student canteen and other basic facilities
- The generalized problem regarding road safety especially during congestion hours.
- The state of maintenance of green space and their suitability to satisfy students and residents local needs.

The study on traffic congestion emphasizes key critical locations close to schools during peak hours and the consequent diminished usability of public spaces. The presence of the University Campus represents a structural component of the study area. There are significant academic functions in the Campus and therefore the study area becomes the destination of daily displacement (for residents and commuters) of the various groups of users mentioned in the context. The abandonment of green areas and school-oriented structures, which deny university students vital services, has an impact on the public space's quality. Ineffective traffic control and a lack of parking near primary schools, as illustrated in Table 2, cause a standstill in road flow (Fig. 2).

Among the proposals of the study, the introduction of "Pedibus," a mode of transportation for kindergarten and primary school students, replaces the use of private cars and public transportation or school bus services. This soft action, in addition to mediating problems relating to traffic, promotes moments of sharing between children after school. The sustainability of the proposal arises from the careful observation of the needs of the students and the potential present in situ. The green areas that act as a hinge between the various institutes, through a process of punctual and systematic enhancement, represent the scenario of daily life. Particular attention to urban furniture and the characterization of the pavement mark a leap towards new forms of socialization and inclusion (Fig. 3).

The project proposal was structured on the basis of the following general requirements:

- Sustainability intended as CO2 emissions reduction depending on the modal shift from cars to active mobility (journey on foot);
- Safety for students moving around the study area based on punctual traffic management solutions favoring pedestrian mobility.
- Sociality, allowing children to socialize with each other during the journey time to and from school along green urban pathways improving the quality of the journey;
- Health, improving the childrens and students' capacity to have outdoor physical activities enjoying functional green spaces.

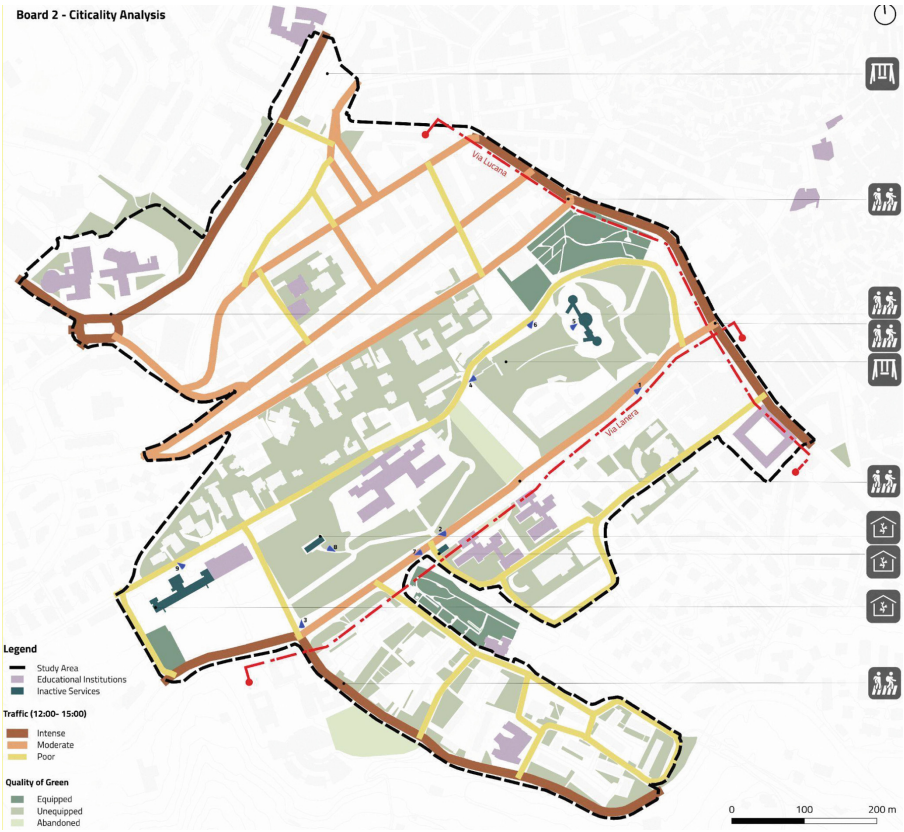

Fig. 2. Study area with indication of services and mobility

Proposed interventions include the main categories proposed by the New Urban Agenda: "hard" and "soft" measures considering both the infrastructural regeneration of specific parts of the case study areas and organizational actions to be (easily) implemented in the short term. The whole schema represents a draft masterplan to be discussed with local stakeholder in order to set priorities, responsibilities and operational dimension of the interventions.

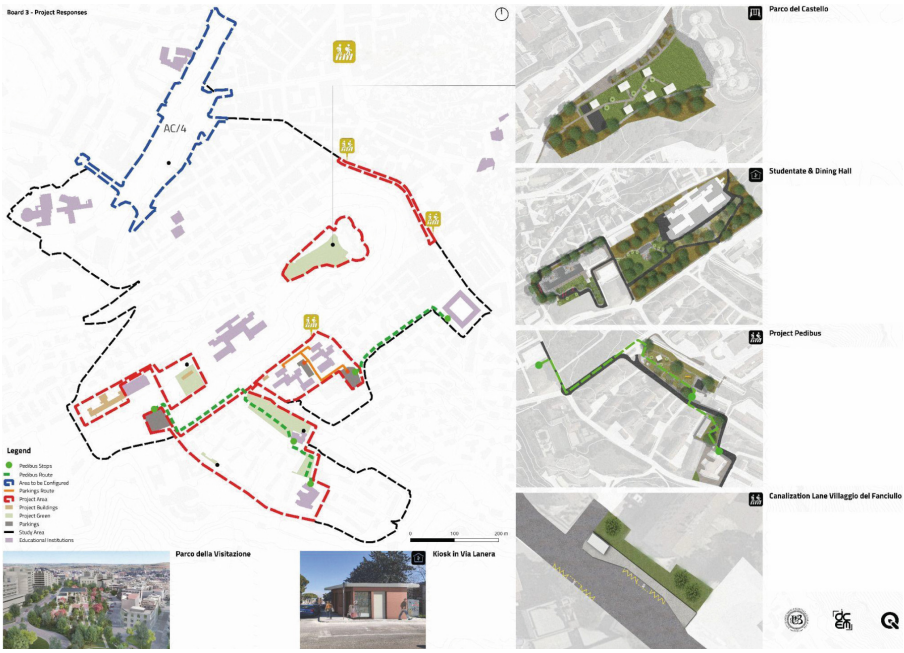

Fig. 3. Study area with indication of proposals

5 Conclusions

The paper discusses an experimental approach oriented to define urban regeneration strategies for the city of Matera (Basilicata, Italy) to address the strategic issues of a specific target of city users and a sub urban area selected according to specific requirements. The approach was structured on NUA principles and follows the way of "downscaling" NUA at local level.

Starting with Goal 11 "Making inclusive, safe, durable and sustainable cities and human settlements," but expanding the reflection to the broad interconnections between all the goals.The target audience for the case study is "age responsive planning," i.e., planning for an age group between 3 and 27 years old, according to the "universal right to education" principle to support the right to quality education and counter the phenomenon of school dropout in the youngest age groups.

The "Child responsive" principle highlights the need to ensure the safety and well-being of young people in urban planning.

The research demonstrated how Matera could become a laboratory of policies to help understand what the role of a medium-sized European, whether urban space can once again become a form of citizenship, conceived as an incubator of the city's civic value, and whether this value can be made legible in urban design and its forms.

The focus of the proposal goes to a set of infrastructures (equipment, services and facilities) designed to meet the needs of the population settled in an urban area, in terms of education, health, leisure, transport, etc.

The "Child responsive" principle highlights the need to ensure the safety and well-being of young people in urban planning, this generates critical remarks for any urban areas and in particular for Matera may represents a challenging perspective to integrate urban regeneration strategies centered on young people needs in the wider scope of cultural and tourism development strategy that the city is running since the nomination to European Capital of Culture 2019.

The recommendation to adopt collaborative design framework is widely accepted and a robust approach has to be adopted to put in practice the operational implementation of such a proposal [28–33].

The robust accounting system generated by the reference matrix provides strong evidence of the quality of the design.

Limitations regard the academic dimension of the laboratory, only partially connected with procedural and administrative rules and constraints characterizing the case study. This research contributes to the open question regarding tools and methodologies to support NUA downscaling at local level [15, 34–37] adopting innovative technologies on the thematic component of urban design.

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