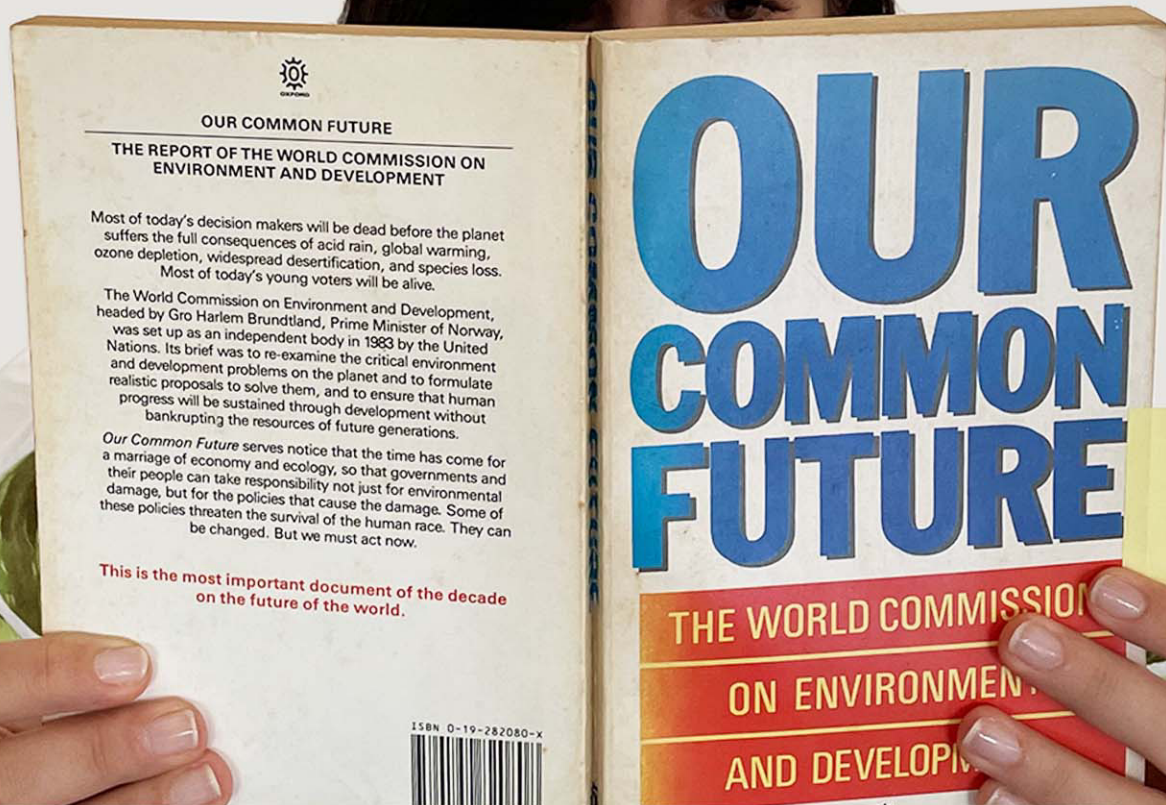


TeMA

Journal of
Land Use, Mobility and Environment

The climatic, social, economic and health phenomena that have increasingly affected our cities in recent years require the identification and implementation of adaptation actions to improve the resilience of urban systems. The three issues of the 16th volume will collect articles concerning the challenges that the complexity of the phenomena in progress imposes on cities through the adoption of mitigation measures and the commitment to transforming cities into resilient and competitive urban systems.

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THE CITY CHALLENGES AND EXTERNAL AGENTS.
METHODS, TOOLS AND BEST PRACTICES



THE CITY CHALLENGES AND EXTERNAL AGENTS. METHODS, TOOLS AND BEST PRACTICES

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The cover image shows a copy of the 1987 UN report "Our Common Future – The report of the world Commission on Environment and Developments". The picture has been taken in TeMA Lab in July 2023. On the bottom, there is a collage made up of four pictures of recent climate disasters (Source: Google images)

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REVIEW NOTES – Urban development and NextGenerationEU The interventions of the Italian Recovery and Resilience Plan: sustainable development

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Abstract

Starting from the relationship between urban planning and mobility management, TeMA has gradually expanded the view of the covered topics, always following a rigorous scientific in-depth analysis. This section of the Journal, Review Notes, is the expression of a continuous updating of emerging topics concerning relationships among urban planning, mobility and environment, through a collection of short scientific papers. The Review Notes are made of five parts. Each section examines a specific aspect of the broader information storage within the main interests of TeMA Journal.

This section of the Review Notes deals with the new frontiers of urban development through the lenses of the European program NextGenerationEU.

In particular, this contribution deals with the topic of sustainable development in urban environments, analysing it in the frame of the Italian National Recovery and Resilience Plan. The paper takes into account the recent PNRR strategies, projects, and initiatives that intervene in multiple sectors - such as the environment, energy, and infrastructures - to promote sustainable development. It provides an overview of the proposed projects and interventions in different urban areas.

Keywords

Sustainable development; NextGenerationEU; Urban development.

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1. Sustainable development in cities

The 1987 Brundtland Commission Report provided one of the first globally recognized definitions of sustainable development, defining it as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987). Albeit the numerous topic updates that occurred since the 1990s (such as the 1992 Earth Summit in Rio de Janeiro, the 1997 Kyoto Protocol, the 2015 Paris Agreement, and the United Nations Climate Change Conferences) this definition is still very contextual (Kwatra et al., 2020). The recent energy crisis, along with the COVID-19 emergency, has, indeed, imposed new challenges for sustainable development (Mukarram, 2020), undermining the availability and equal distribution of resources for future generations and communities.

In this context, due to the increasing urbanization and its economic, social, and environmental consequences, cities have settled their role as main actors in accelerating the transition towards sustainable development models (Guida & Natale, 2021). Currently, more than half of the global population lives in urban areas and the phenomenon is going to accelerate in the coming decades (UN, 2022). In this scenario, hurried and inadequately structured urban development gives rise to numerous obstacles to sustainable development, comprising shortage of affordable housing, inadequate transportation and essential services, hazardous levels of air pollution, as well as vulnerability to climate change and natural calamities that involve not only urban areas but also neighboring territories (Campbell, 1996; Krähmer, 2021). Covid-19, in the first instance (Lai et al., 2020), and the Ukrainian-Russian war implications, in the second (Cutini et al., 2023), have further stressed this situation, emphasizing the issues deriving from relying on non-renewable resources, like environmental pressures, unsustainable production patterns, let alone inequalities and poverty (da Costa et al., 2023).

The bright side is that numerous advantages can result from the implementation of sustainable solutions in urban areas, both directly and indirectly. Several studies have demonstrated that making cities more sustainable can effectively mitigate adverse environmental, social, and economic conditions, improve citizens’ quality of life, and increase attractiveness and territorial competitiveness (Sgambati et al., 2022; Fan et al., 2023). The implementation of sustainable development strategies in cities can minimize energy consumption, waste production, and the use of unsustainable energy sources (Galderisi et al., 2016). This may bring the reduction of air pollution, the preservation of ecosystems, and the mitigation of climate change consequences (Pilllogallo et al., 2019; Lai et al., 2021). Furthermore, sustainable development strategies contribute to creating healthier and safer living environments, guaranteeing different population categories equitable and just services. Regarding equity, implementing sustainable measures means ensuring equal access to resources and opportunities for all residents and guaranteeing that level of accessibility to future generations (Davidson, 2010). Sustainable urban development aims at reducing disparities in income, education, healthcare, and access to essential services.

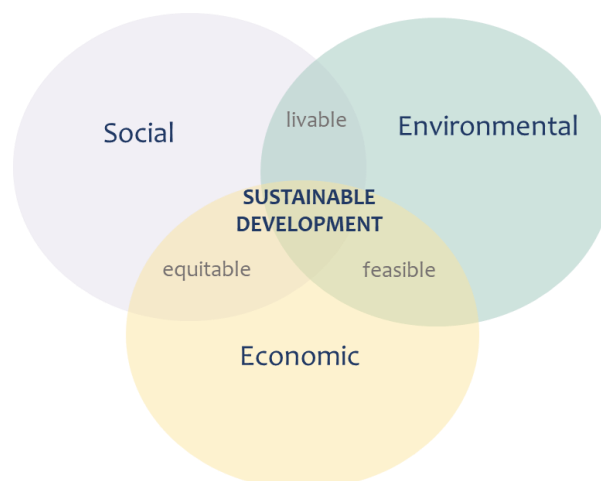


Fig.1 Dimensions of sustainable development

Governing urban transformations towards more sustainable standards helps in creating well-designed, compact, and walkable cities with efficient infrastructures and improved connectivity (Papa et al., 2016). In brief, sustainable development in cities aims to strike a balance between economic growth, social well-being, and environmental protection (Fig.1), leading to more resilient, inclusive, just, and livable urban environments (Duran et al., 2015).

1.1 SDG11 - Sustainable Cities and Societies

In 2015 the United Nations adopted the 2030 Agenda for Sustainable Development comprising 17 Sustainable Development Goals (SDGs) (UN, 2015) to achieve by 2030. SDGs are a call to action to reduce disparities, protect the environment, and end poverty, covering a range of issues and involving several subjects and entities.

Particularly, SDG 11 is dedicated to building more sustainable communities and societies in cities, making human settlements inclusive, safe, and resilient, and promoting sustainability in cities either in the social, economic, and environmental spheres. It is structured in 7 targets that afford different urban challenges, namely:

- Target 11.1 deals with the quality of living: this target aims at making cities pleasant, safe, and adequate environments where to live, ensuring diffused well-being - regardless of population classes - and reducing the proportion of the urban population living in slums;
- Target 11.2 concerns public transport: this target aims to provide safe and equitable access to public transport systems for the population living in cities, improving road safety, expanding public transport supply, and focusing on the most vulnerable groups, such as the elderly, persons with disability and children;
- Target 11.3 deals with inclusive and sustainable urbanization: given the unprecedented urbanization that has characterized numerous urban areas over the past decades, this target aims at limiting uncontrolled urban sprawl, and creating integrating and cutting-edge urban communities;
- Target 11.4 deals with the protection of natural and cultural heritage to preserve cities' identity and history and their natural resources;
- Target 11.5 concerns the response to natural disasters: it aims at reducing exposure and vulnerability of urban areas to natural disasters, focusing, in particular, on poor and vulnerable people;
- Target 11.6 regards environmental pollution and waste: it aims at reducing the environmental impact of cities, paying attention to air quality and waste management;
- Target 11.7 deals with accessibility to green and public spaces: this target aims at enhancing access to services, public spaces, and retail facilities to different segments of the population;

In summary, according to Agenda 2030, fostering sustainable development in cities can generate added value on multiple levels, such as quality of life, production and economy, mobility, environment, governance, safety, as well as competitiveness. Given the recent changes that have disrupted the state of equilibrium preceding the pandemic, cities need to tackle these issues to achieve sustainable development objectives (Cirianni et al., 2022).

2. Sustainable development in the NGEU program and the Italian PNRR

The 2020 pandemic as well as the 2022 Russian-Ukrainian crisis are spurring countries and territories to reconsider their sustainable development pathway. In Europe, the Next Generation EU program was adopted in 2021 by the European Commission to respond to Covid-19 and relaunch the development of member states (EC, 2021). It is a temporary €750 billion financial instrument designed to stimulate a 'sustainable, even, inclusive and equitable recovery', aimed at revitalizing economies, laying the foundations for a more digital-

friendly, greener, and inclusive Europe, and facing unforeseen needs and challenges. Among the objectives of the Next Generation EU, there is the transition to a resource-efficient economic model not relying on resource consumption for economic growth. The program aims at making European countries greener and more resilient, and, inherently, more sustainable (Gargiulo et al., 2022). The transition to a sustainable and circular economy is going to enhance the European GDP by an additional 0.5% by 2030, creating about 700,000 new jobs (EC, 2020). For this reason, national governments in the EU have allocated substantial resources from recovery programs to the green transition, in particular to the refurbishing and energy upgrading of buildings, sustainable mobility, and the use of renewable energy sources. Furthermore, other sectors of investment are health, mobility infrastructures, and social inclusion and cohesion, all aspects that can be traced back to the three-fold concept of sustainability (either environmental, social, or economic).

In the case of Italy, one of the main objectives of the National Recovery and Resilience Plan (Governo Italiano, 2021) is to promote sustainable and resilient development of territories. This entails implementing measures that enhance environmental preservation, decrease the release of greenhouse gases, and enhance the overall well-being of residents. Specifically, the green transition is one of the main pillars of covering a total budget of €59.47 billion, along with infrastructures for sustainable mobility (€25.40 billion), inclusion and cohesion (€19.81 billion), and health (€15.63 billion) (Openpolis, 2021). The distribution of funds highlights that sustainability is one of the guiding principles of the Italian NRRP. Tab.1 displays the sectors of investment of the plan - for which territorial entities have a key role in the implementation - assigned to the three components of sustainable development, namely environmental, social, and economic.

Sustainability dimension	NRRP Pillar	NRRP sectors of investment
Environmental	Ecological transition	Land protection
		Renewable energy
		Circular economy
	Infrastructure	Railways
		Built heritage
		Public transport services
Social	Health	Territorial healthcare services
		Hospitals
	Social Inclusion and cohesion	Social infrastructures
	Education	Right to study
		Education infrastructures
Economic	Jobs and business	Competitiveness and innovation
		Employment
		Agriculture
	Digitalization	Digital enterprises

Tab.1 The NRRP sectors of investment articulated per dimensions of sustainable development (Source: Author)

It can be concluded that the Italian NRRP can contribute to sustainable development in cities in different ways:

- by the promotion of energy efficiency: cities can receive funding to retrofit existing buildings, install more efficient heating and cooling systems, implement smart energy management technologies, and introduce renewable energy sources. This reduces the environmental impact and improves the quality of life of citizens;
- by fostering sustainability of the transport system: the NRRP aims to invest in sustainable mobility, e.g. by improving and expanding public transport infrastructure, promoting the use of low-emission vehicles,

or promoting cycling and electric vehicles. This helps to reduce air pollution and traffic, improving air quality and urban livability;

- by promoting urban requalification: through the NRRP, cities can receive funding for the regeneration of degraded or underused areas, the rehabilitation of abandoned or unused buildings, the creation of urban parks and green spaces, and the promotion of sustainable building solutions. This enables to improve the quality of urban spaces and social fabric, as well as create new job opportunities;
- by boosting digital transition: the plan envisages a strong digitization component for cities. This includes the development of digital public services, the implementation of new smart technologies for waste management, lighting, irrigation, security as well as the management of urban services. Digital innovation can improve the efficiency, safety, and quality of urban services, contributing to overall urban sustainability.

To conclude, through these measures and investments, the NRRP aims to foster the construction of sustainable and resilient cities, geared towards increasing environmental protection, reducing greenhouse gas emissions, and improving the quality of life of citizens.

In the following tables, there is reported a selection of strategies, plans, and projects that can be contextualized in this frame, namely interventions concerning sustainable development and financed by the plan.

Urban and suburban forestation in metropolitan areas

Biodiversity conservation has a key role in achieving the goals of the Paris Agreement and the 2030 Agenda because it gives an important contribution to carbon sequestration and carbon storage and adaptation to climate change, which, on the other hand, is one of the causes of biodiversity loss, with a strong negative impact on many ecosystem services on which cities' livelihoods and well-being depend. Compared to this overall background, one of the most important biodiversity issues addressed by international and regional strategies and Italian initiatives is the conservation of forests, which is fundamental for ensuring the survival of plants, animals, and other organisms, and for the maintenance of fundamental ecosystem services including biomass production, carbon storage, regulation of the water cycle and various bio-geochemical components, soil protection, and cultural services, with a significant impact on the natural and urban environment. A significant part of the forestry theme is forestation in urban, peri-urban, and suburban areas, particularly in large metropolitan areas. It is one of the most economical and affordable nature-based solutions to improve the environmental performance, resilience, and climate adaptation of cities. The Urban and Suburban Forestation Plan represents a tool that allows all metropolitan cities to follow a common methodology, based on solid scientific references, to identify and plant the right tree in the right place (Conzonato & Sforzini, 2022).

This investment is part of the Mission 2 of the NRRP on Ecological Transition and the implementing subject is the Ministry of Environment and Energy Security. The objective is to plant more than 6.6 million trees in urban forests, namely those forested areas neighboring the 14 Italian metropolitan areas (Bari, Bologna, Cagliari, Catania, Florence, Genoa, Messina, Milan, Naples, Palermo, Reggio Calabria, Rome, Turin, and Venice), identifying native, certified species. The ultimate aim is to protect land and water resources and safeguard air quality and biodiversity, as well as improve the quality of life and well-being of citizens. The identification of the areas for reforestation must meet many requirements such as being on public land, being consistent with the urban-territorial, environmental, and landscape planning regulations, and envisaging a 5-year cultivation plan for maintenance.

Redevelopment of Taverna del Ferro and Vele di Scampia settlements in Naples

These two integrated plans, promoted in Naples within the NRRP mission M5 "Inclusion and Cohesion" and the component "Social infrastructures", aim at redeveloping two degraded settlements of Naples suburban areas, specifically the 'Taverna del Ferro' area (in the eastern part of the city, specifically the district of San Giovanni a Teduccio) and the complex 'Vele di Scampia' (in the northern suburbs), both identified as vulnerable areas of the Neapolitan territory. Both the interventions provide for the demolition of the existing complexes – built between the 70s' and the 80s' - and the construction of new housing infrastructures with facilities, a linear urban park for San Giovanni, and an eco-district for Scampia. The interventions concern two areas currently characterized by a diffuse state of degradation, marginalization, poverty, and inadequate environmental quality.

The objective of the interventions is the redevelopment of the two settlements, aiming at improving the quality of residential spaces, and energy efficiency, along with rethinking the relationship between the built environment and public space.

The main lines of actions of the plans, that can be traced back to sustainable development, are:

- maintenance for the eco-sustainable reuse and re-functionalization of large areas and related existing public building structures for purposes of public interest;
- improvement of a large degraded urban area, for regeneration and economic revitalization, through the appropriate integration of secondary facilities serving residential units;
- upgrading of buildings' energy efficiency and demolition of the remainder for the construction of new residential buildings with the n-ZEB building performance requirement and eco-districts;
- creating a renovated balance between built-up areas and green areas.

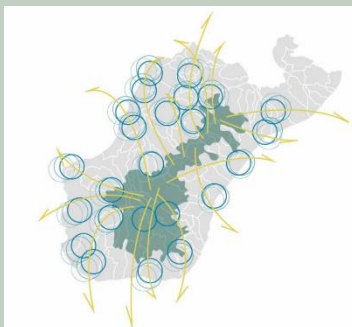
Thus, it may be deduced that these projects deal with all the components of sustainable development, taking into consideration social aspects, economic revitalization, as well as "green" objectives at the same time, dealing with the availability of existing resources. Furthermore, the Integrated Plans provide forms of participation and social innovation, empower social services and enhance ecosystem services. The expected results in the field of sustainability concern, first, the mitigation of climate change's negative effects; second, re-functionalization and adaptation of residential buildings to standards of sustainability and social justice; third, the creation of micro-models of sustainable economies and communities; finally the two interventions are thought to be the trigger for the regeneration of entire districts.

Come_IN, City of Milan

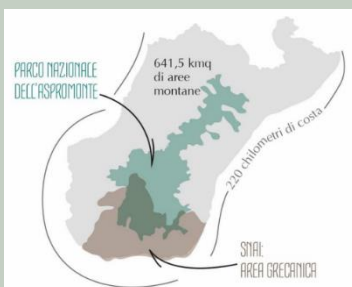
Come_IN is an integrated urban plan promoted by the city of Milan aiming at increasing inclusion in the metropolitan area through interventions of urban regeneration, with particular attention to population classes living in marginal conditions. The municipalities embedded in the metropolitan area of Milan are called upon to propose interventions of regeneration aiming at mending urban and suburban fabric, bridging infrastructure deficits, and improving access to services.

The primary objective of the investment is to rehabilitate spaces and buildings in a state of decay with the introduction of new services and the improvement of accessibility and intermodality of existing infrastructures. This objective will also be pursued by promoting social and entrepreneurial participation processes, in order to involve communities in social, cultural, and economic activities with special attention to environmental aspects. The interventions financed through this plan fall into four strands: i) recovery interventions for aggregative and social purposes of sports facilities located in the consolidated fabric of the city; ii) redevelopment projects of local or metropolitan parks and internal bicycle and pedestrian routes; iii) redevelopment of historic buildings and monastic complexes and allocation of the relative spaces for institutional and cultural events; iv) creation of spaces for social and cultural activities and activation of support functions for collective and associative life. Therefore, this plan can be seen as closer to the social sphere of sustainable development.

Reggio Calabria integrated Plan "Aspromonte in Città – A green, sustainable, inclusive and smart city"



With this integrated plan, the Metropolitan City of Reggio Calabria intends to concretely start the sustainable development transition process, aiming for the creation of a green, sustainable, inclusive, and smart city. The focus of the plan is the National Park of Aspromonte, which intends to be the core of the metropolitan area to be connected to the coast and all the urban centers disseminated in the territory. The plan emphasizes the role of designed green urban areas to fill the distributional and qualitative gaps of public and green spaces within the densest inhabited areas and to favor environmental recovery and protection. The project is characterized by many areas of interventions, namely the re-functionalization and reuse of public areas and buildings, the improvement of urban decorum, the enhancement of social services, the promotion of cultural and sports activities, the improvement of the sustainable transport system, and energy efficiency.



The interventions proposed by the plan derived from the elaboration of criteria and principles aimed at promoting sustainable development and operating on different and integrated territorial scales. Among the projects embedded within the plan, there is an integrated intervention for sustainable mobility within the entire metropolitan area. Furthermore, the city promotes the functionalization of existing public buildings to be destined for metropolitan services. The intervention "BiodiverCity" consists of a system of actions aimed at strengthening the transition process towards green and sustainable cities. It envisages the creation of a permanent laboratory for the coordination and direction of project

activities, experimentation, and research on the transition towards green, sustainable, inclusive, and smart cities. The project "RI.CO.PO" intends to strengthen ecological corridors and link the territory to the sea, with the overcoming of architectural barriers and the improvement of pedestrian and cycling mobility. Another project regards the redevelopment and recovery of disused areas, urban sites, and industrial artifacts in the urban area of Villa San Giovanni-Campo Calabro,

for social and environmental purposes. It is linked to the requalification of the park "Parco dei Cardì" which proposes the recovery of a dismissed industry, giving value to the historical and environmental value of the park. Finally, many interventions intend to make Reggio Calabria a smart city, by creating platforms to support policy-makers in monitoring the interventions and making the right choices for future development.

These are just some of the proposed projects that aim at improving urban quality, enhancing social, environmental, and economic fabric, empowering social and cultural services, and increasing the environmental performance of the city. All in all, these objectives might be framed in the vision of sustainable development, involving different areas of interventions, such as urban regeneration, reuse of public buildings and spaces, and digitalization of public services.

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