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CASE STUDY

Urban Soil Restoration and Green Infrastructure Development at “Biblioteca degli Alberi Milano” (Italy)



Project full title: Enhancing Technical and Vocational Skills for Implementing Nature-Based Solutions (NbS) to Combat Land Degradation

Project acronym: NbS4LD

Project number: 2025-1-TR01-KA220-VET-000357096

Project activity: WP2 Developing Educational Resources on NbS for Combating Land Degradation

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1. INTRODUCTION

This case study has been analysed by the [European Research Institute Foundation ETS \(ERI\)](#), a partner organisation of the NbS4LD project. ERI is a non-profit organization founded in 2011 in Turin, Italy, dedicated to research, innovation, and sustainable development. ERI works to improve social, economic, and cultural conditions by promoting inclusion, equity, cultural diversity, and respect for the environment. The organization focuses on environmental protection, biodiversity conservation, climate change mitigation, and sustainable management of urban, peri-urban, rural, and natural areas. ERI collaborates with public institutions, businesses, start-ups, and local communities, combining expertise in research, project planning, communication, and implementation. With offices across Italy and a branch in Hungary, ERI has developed significant experience in managing European-funded projects. ERI specializes in environmental education, stakeholder engagement, and scientific communication, supporting communities, authorities, and organizations in developing sustainable solutions. Through research, awareness activities, and innovative approaches, ERI contributes to biodiversity protection, climate resilience, and the transition toward sustainable development.

The Biblioteca degli Alberi Milano project is a Nature-Based Solution intervention that restored a degraded 10-hectare post-industrial brownfield in the Porta Nuova district of Milan, Italy. Before intervention, the site had compacted, low-quality soil, limited vegetation, poor infiltration capacity, and lacked public green space despite rapid urban growth and high population density. Implemented between 2015–2018, the project transformed the area into a multifunctional urban ecosystem through soil restoration, large-scale tree planting, biodiversity habitats, and ecological landscape design. Led by the Municipality of Milan in partnership with COIMA and managed by Fondazione Riccardo Catella, the project used a public-private partnership model to ensure long-term maintenance and governance. The park improved soil functions, increased vegetation cover, enhanced biodiversity, and strengthened ecosystem services such as cooling, air purification, and stormwater management.

Socially, the intervention created accessible green space, supported community activities, and improved urban quality of life. Economically, although requiring high initial investment, it increased district value and demonstrated sustainable urban regeneration. The project represents an innovative model combining ecological restoration, urban development, and collaborative management. Due to its effectiveness and adaptability, Biblioteca degli Alberi provides a replicable example of urban Nature-Based Solutions for other cities facing land degradation, climate pressures, and limited green infrastructure.

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[The area before the start of the interventions - Source: BAM Milan official website]

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[The transformation: from Expo 2015's Wheatfield by Agnes Denes, to the 2017 first opening and community planting phases - Source: BAM Milan official website]

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[Inauguration by Petra Blaisse in 2018 - Source: BAM Milan official website]

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2. CONTEXT

2.1 LOCATION

Country: Italy. Region: Lombardy Region. Province: Milan. Site: Biblioteca degli Alberi (Porta Nuova District). Approximate GPS coordinates: Latitude 45.4836° N - Longitude 9.189° E.



2.3 LANDSCAPE TYPE

Urban Ecosystems.

2.4 LAND DEGRADATION CHALLENGE

Poor land management. Urban expansion. Climate change.

2.5 BASELINE DATA

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Land condition	• Site: 10 hectares of post-industrial brownfield within Porta Nuova, previously occupied by warehouses and construction yards. • Soil: highly compacted, low organic matter (<2%), poor infiltration, risk of waterlogging in some areas. • Vegetation cover: <5%, mostly sparse weeds and remnant shrubs. • Erosion status: soil sealing and temporary uses (such as construction yards and abandoned lots) reduced infiltration capacity and increased surface runoff.
Environmental context	• Climate: temperate continental, average annual precipitation about 1000 mm, summer heat waves intensified by urban heat island. • Hydrology: impermeable surfaces prevented natural groundwater recharge; stormwater runoff was directed into municipal drainage. • Biodiversity: extremely low; no native tree species, minimal insect or bird activity. • Environmental pressures: urban pollution, air quality issues, habitat fragmentation.
Socioeconomic context	• Population: high population density (rapidly developing urban district with approximately 8,000–10,000 residents per km² in the Porta Nuova area). • Livelihoods: mixed residential, commercial, and office-based activities, supported by a growing real estate and business sector. • Land management: mixed public and private ownership, characterized by a mixed-use urban redevelopment area with buildings, infrastructure, and public spaces. • Resource dependency: limited access to public green space before redevelopment, with few local ecosystem services available for recreation, urban cooling, and environmental benefits.
Policy and governance	• Institutional framework: before the intervention, there was no coordinated management or ecological plan for the site. Land ownership was a mix of public and private, and decision-making was fragmented, with temporary uses and informal leases dominating the land management.

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3. INTERVENTION

3.1 TIMEFRAME

Planning: 2005-2010. Implementation: 2015-2018. Operational: 2018-present.

3.2 TYPE OF INTERVENTION

Afforestation. Biodiversity shelters.

3.3 IMPLEMENTING ORGANISATIONS

The project was led by the Municipality of Milan (public sector), in partnership with COIMA (private developer). Long-term management is carried out by Fondazione Riccardo Catella (private sector). Landscape architects and environmental designers contributed to planning and implementation. The intervention was part of Milan's broader urban redevelopment framework under the Porta Nuova regeneration strategy.

3.4 FUNDING SOURCES

The intervention was financed through a public-private partnership (PPP) model. Private investment was provided by COIMA as part of the Porta Nuova real estate development. The Municipality of Milan contributed through planning and public infrastructure support. Long-term maintenance and programming are funded by Fondazione Riccardo Catella, ensuring financial continuity beyond the construction phase. This hybrid financing model integrates urban development capital with environmental restoration goals, aligning economic incentives with ecosystem regeneration.

3.5 IMPLEMENTATION ACTIONS AND MEASURES

- 1) February 2014: the Dutch studio Inside Outside - Petra Blaisse won the international competition launched by the City of Milan to design a new public park in the Porta Nuova district of Milan.
- 2) April-July 2015: During Expo, the Riccardo Catella and Nicola Trussardi Foundations staged Wheatfield, a 5-hectare wheat field by American artist Agnes Denes in the future Biblioteca degli Alberi park. The environmental artwork, celebrating food sharing, sustainability, and community, engaged 9,000 people through three public events.
- 3) June 2015: COIMA (Consulente Immobiliari associati) replaces the City of Milan as the contracting authority for the park's construction.
- 4) 1st of April 2017: The inauguration of the first section of the Biblioteca degli Alberi, featuring three types of trees and 44 specimens, as well as family-friendly amenities such as picnic areas, bocce courts, accessible playgrounds, water features, and educational gardens.
- 5) May-September 2017: the Fondazione Riccardo Catella, in collaboration with the Milanese administration, involved citizens in the park's development through the active participation project "MiColtivo nel parco": three days dedicated to the collective planting of flower meadows,

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flowerbeds, and trees, along with a program of free urban horticulture workshops.

6) May-Sep 2018: The Riccardo Catella Foundation organizes guided tours, concerts, sports, and educational events before the park opening.

7) July 2018: Riccardo Catella Foundation and COIMA propose a public-private partnership to manage the park.

9) October 2018: Official inauguration of Biblioteca degli Alberi with Milan Mayor Giuseppe Sala, COIMA CEO Manfredi Catella, and designer Petra Blaisse; live music from Teatro alla Scala marks the ribbon-cutting.

10) Jul 2019: City of Milan, COIMA, and Riccardo Catella Foundation sign a sponsorship contract for park maintenance and management, establishing a pioneering public-private collaboration.

4. IMPACT

4.1 ENVIRONMENTAL IMPACT

☒ Improved soil health or reduced soil erosion. ☒ Increased vegetation cover or habitat restoration. ☒ Improved biodiversity. ☒ Reduced land degradation. ☒ Improved ecosystem services.

The intervention transformed a degraded and sealed site into a functional urban ecosystem. Soil health improved through decompaction and organic enrichment, restoring infiltration capacity and biological activity. Vegetation cover increased significantly, supporting biodiversity (pollinators, birds, urban flora). Land degradation was reversed by restoring soil ecological functions. Ecosystem services such as urban cooling, air purification, and stormwater regulation were enhanced, contributing to climate adaptation.

4.2 COMMUNITY IMPACT

☒ Strengthened community resilience. ☒ Increased local capacity or skills.

The park provides accessible green space in a dense urban area, improving quality of life for the inhabitants of the area. The space hosts cultural events and community activities, fostering social and community cohesion. The intervention also increased the attractiveness and economic value of the district, while raising awareness of sustainable urban practices.

4.3 INSTITUTIONAL IMPACT

☒ Establishment of new management structures or partnerships. ☒ Integration into local or national planning.

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The project established an innovative governance model combining public authorities, private investors, and a non-profit foundation. It has been integrated into Milan's urban sustainability strategy and serves as a model for collaborative green space management.

4.4 SUSTAINABILITY OF THE RESULTS

☑ Long-term funding mechanisms. ☑ Institutional support or partnerships. ☑ Local technical capacity for maintenance. ☑ Monitoring and adaptive management systems.

Long-term sustainability is ensured through institutional partnerships and dedicated funding for maintenance. The park is integrated into urban planning strategies and benefits from continuous management by a specialized foundation. Adaptive management practices allow the park to respond to environmental and social changes over time.

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5. CONCLUSION

- **Community relevance:** mostly.
Addressed the lack of accessible green space and degraded urban land in a dense city district. Created a public green area that provides recreation, social interaction, and environmental benefits.
- **Technical effectiveness:** fully.
Restored ecological functions through soil improvement, biodiversity enhancement, large-scale planting, and creation of new habitats. Integrated nature-based solutions into urban regeneration.
- **Economic efficiency:** mostly.
Required high initial investment, but generated long-term economic, social, and environmental value through increased land value, improved quality of life, and sustainable development.
- **Institutional support:** fully.
Supported by strong cooperation between public and private stakeholders through shared governance, partnerships, and long-term management strategies.
- **Innovation:** fully.
Introduced innovative approaches by combining urban regeneration, ecological design, green infrastructure, and social programming within a nature-based solution framework.
- **Replication & Scaling Potential:** fully.
Can be adapted to other dense urban areas by applying similar methods of soil restoration, green infrastructure development, and multifunctional public space creation.

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