

# Sustainability Assessment: from Brundtland Report to Sustainable Development Goals

Giulio Mondini\*

*keywords:* integrated evaluation, decision-making processes, sustainable communities, urban transformations

## Abstract

*The increase in population, the urbanization processes and the heavy anthropic interventions are bringing new and differentiated stresses for environmental and urban systems, including socio-economic pressures and natural disasters. The problems that societies have to address nowadays are numerous, ranging from environmental pollution to soil consumption, from the lack of water and food to the necessity of biodiversity protection and climate change reduction.*

*Immediate and efficient solutions are needed in order to avoid the achievement of an irreversible condition. In this context, the concept of sustainability has been pro-*

*posed since many years as an innovative paradigm of intervention, with the objective of limiting these problems and to mitigate their effect in the long period.*

*The paper aims at briefly illustrating the concept of sustainable development, focusing on its evolution over the years, from the Brundtland Report to Sustainable Development Goals that have been recently proposed by the United Nations. Particular attention will be devoted to the analysis of the relationship between sustainability and urban and territorial planning, trying to identify the main existing approaches for the introduction of sustainability as the fundamental paradigm for future development.*

## 1. INTRODUCTION

As it is well known, sustainable development has been defined in 1987 by the Brundtland Commission as the development that meets the needs of the present without compromising the ability of future generations (UN, 1987).

The characterizing aspect that emerges from this definition is the long-term vision, which implies the need of addressing a high degree of uncertainty (Munda, 1987).

Several dimensions have been identified in the concept of sustainable development (environmental, social, economic, cultural and technological dimension) which have to co-

exist within an integrated perspective (Bottero and Mondini, 2009).

The Brundtland report represents a fundamental act for the introduction of the concept of sustainability in the legislative frameworks. Indeed, starting from this document a continuous process has been set up for the consideration of the sustainability as fundamental paradigm of action (Lafratta, 2004).

A further step in the process for the achievement of sustainable development refers to the identification of the Millennium Development Goals (MDG). These objectives have been defined in the year 2000 and they define a com-

plex series of targets which range from halving extreme poverty rates to halting the spread of HIV/AIDS and providing universal primary education (UN, 2015a).

More recently, the United Nations defined 17 Sustainable Development Goals (SDGs). In particular, the SDGs address the global challenges, including those related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice (Table 1). These objectives are strongly interconnected among them and involve all the sustainability dimensions at a planetary scale (Figure 1).

In the context of urban transformations, a particular role is played by the SDG 11 “Sustainable cities and communities”, which explicitly considers the relationship that exists between communities and the spaces in which they live. According to the fundamental principles of this goal, future cities should aspire to social inclusion and have to be designed for being compatible with the surrounding environment (Bond et al., 2012; Mondini, 2016). Specific importance is attached to:

1. the availability of adequate, safe and affordable housing,
2. the protection of natural and cultural heritage and 3. the adoption and implementation of integrated policies and plans towards inclusion,

resource efficiency, mitigation and adaptation to climate change and resilience to disasters.

## 2. THE SUSTAINABILITY PROJECT

In terms of sustainability (maximizing and minimizing simultaneously in order to achieve a balanced development of the economic, social and ecological system), the evaluation process must be highly interdisciplinary, in order to identify possible synergies and develop “win – win” solutions (Kosko, 1986; Stellin and Rosato, 1998; Bottero et al., 2018a; Fattinanzi, 2018). Given the growing interdependence between parties that characterizes the actual problems/contexts, the complexity notion became a crucial concept in sustainability evaluation and assessment (Figueira et al., 2015; Becchio et al., 2018; Bottero et al., 2018b).

In particular, with regard to issues related to development, in the processing and management of territorial and urban systems, the complexity of decision-making requires the adoption of four levels of analysis: meta-strategic, strategic, tactic and operational (Girard and Nikkamp, 1997; Mondini, 2010; Trossero and Lombardi, 2013).

Different methods can be employed for sustainability assessment and the choice of the method strictly depends from the phase in which the evaluation takes place:

1. knowledge phase,
2. concertation phase,
3. strategic definition of objectives phase,
4. systemic evaluation phase and
5. monitoring phase (Tab. 2) (Mondini, 2009).

In the previous paragraph, reference was made to the eleventh UN Sustainable Goal, dedicated to the theme of “*Sustainable cities and communities*”. Cities are emblematic elements for the definition of sustainable development. In fact, cities are at the same time critical and cardinal elements for achieving sustainable development (Mi, 2019). Cities are complex systems characterized by a high environmental impact, as energy consumption and depletion of a high quantity of natural resources (Booth et al., 2011; IPCC, 2014; Mi et al., 2019).

Cities are therefore built as key players in the field of urban sustainability, helping to contrast climate change and reduce emissions into the atmosphere (Amendola, 2016).

Sustainability has been used for several decades as a paradigm for territorial and urban transformations and designs in order to mitigate its impacts on the environment, with the ultimate goal of creating sustainable communities in response to the ongoing process of urbanization (Roberts and Hugh, 2000; Bottero and Ferretti, 2010; UN-Habitat, 2015; Habitat\_III, 2016; UN-Habitat, 2016).

In the context of urban sustainability assessment, different models and frameworks have been proposed in the last years in order to support designers, planners and Decision Makers in the choices related to urban transformations. Table 3 summarizes the main initiatives available in the field of urban sustainability assessment methods.

As it is possible to see from Table 2, sustainability indicators are a proven method for driving sustainable urban development, and hundreds of different sets and frameworks exist. As cities vary greatly in terms of available resources, population size and urban metabolic processes, this wealth of tools is useful. However, choosing appropriate sustainability indicators can be difficult.

Scientific research in this field has highlighted that efficient and science-driven governance is a critical component of sustainable development. As instruments for measuring progress or diagnosing urban sustainability, sustainability indicators provide the simple and measurable tests needed to create and maintain cities not only respecting the environment, but also promoting long-term economic productivity and health and the well-being of their citizens (Ameen et al., 2015).

## 3. TOWARDS SUSTAINABLE COMMUNITIES

As already mentioned, the process towards the achievement of SDG 11 requires innovative solutions based on the integration of the different dimensions and on the consideration of the citizens as key players of the operation.

In this perspective, a very important role is covered by urban regeneration programmes, meaning not only building-restoration operations, but also programs aiming at eliminating social decline, increasing the quality of life

**Table 1 - 17 Sustainable Development Goals (SDG)**

Goal	Description
 <b>No Poverty</b>	End poverty in all its forms everywhere
 <b>Zero Hunger</b>	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
 <b>Good Health and Well-Being</b>	Ensure healthy lives and promote well-being for all at all ages
 <b>Quality Education</b>	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
 <b>Gender Equality</b>	Achieve gender equality and empower all women and girls
 <b>Clean Water and Sanitation</b>	Ensure access to water and sanitation for all
 <b>Affordable and Clean Energy</b>	Ensure access to affordable, reliable, sustainable and modern energy
 <b>Decent Work and Economic Growth</b>	Promote inclusive and sustainable economic growth, employment and decent work for all
 <b>Industry, Innovation and Infrastructure</b>	Build resilient infrastructure, promote sustainable industrialization and foster innovation
 <b>Reduced Inequalities</b>	Reduce inequality within and among countries
 <b>Sustainable Cities and Communities</b>	Make cities inclusive, safe, resilient and sustainable
 <b>Responsible Consumption and Production</b>	Ensure sustainable consumption and production patterns
 <b>Climate Action</b>	Take urgent action to combat climate change and its impacts
 <b>Life Below Water</b>	Conserve and sustainably use the oceans, seas and marine resources
 <b>Life on Land</b>	Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss
 <b>Peace, Justice and Strong Institutions</b>	Promote just, peaceful and inclusive societies
 <b>Partnership for the Goals</b>	Revitalize the global partnership for sustainable development

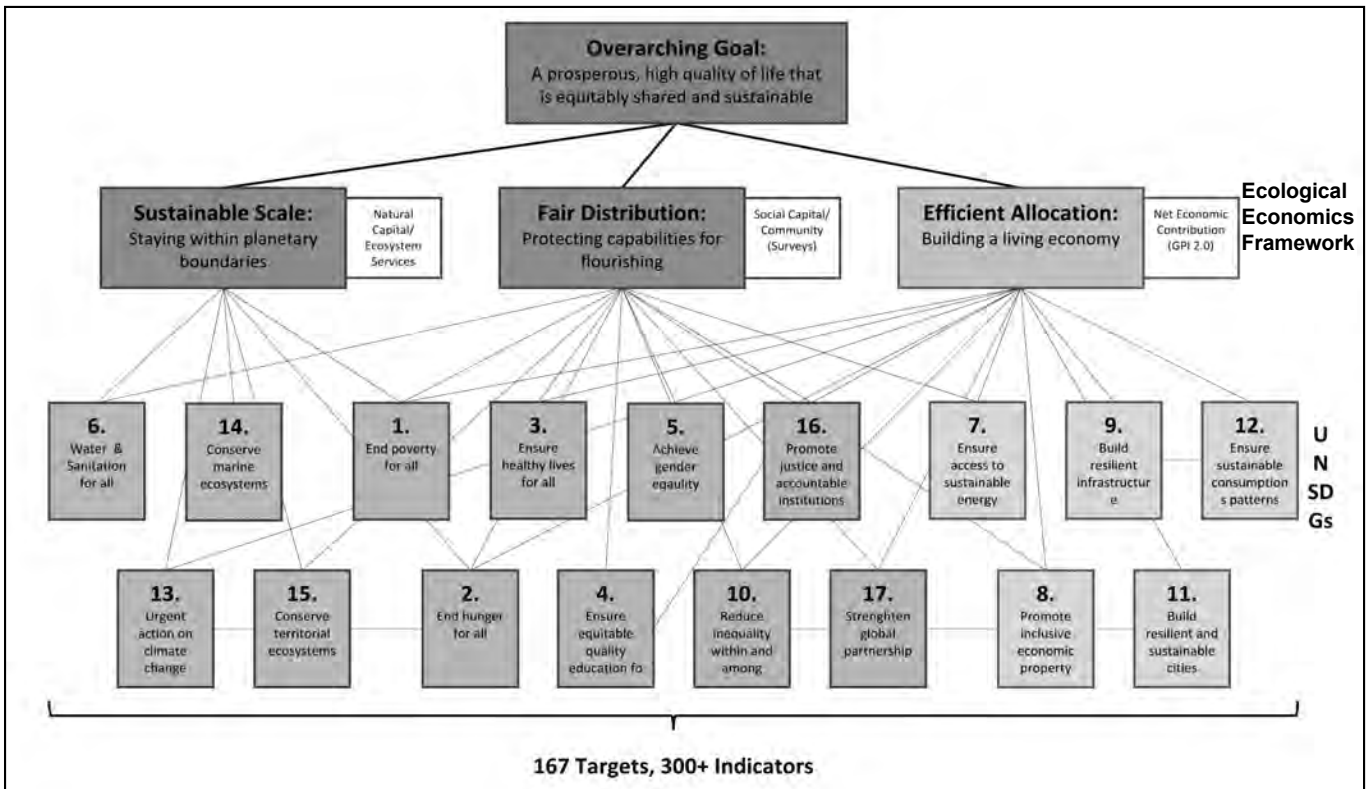


Figure 1 - Relationship between the 17 goals (SDG) and the three main dimensions of sustainability (source: elaboration by Costanza et al., 2019)

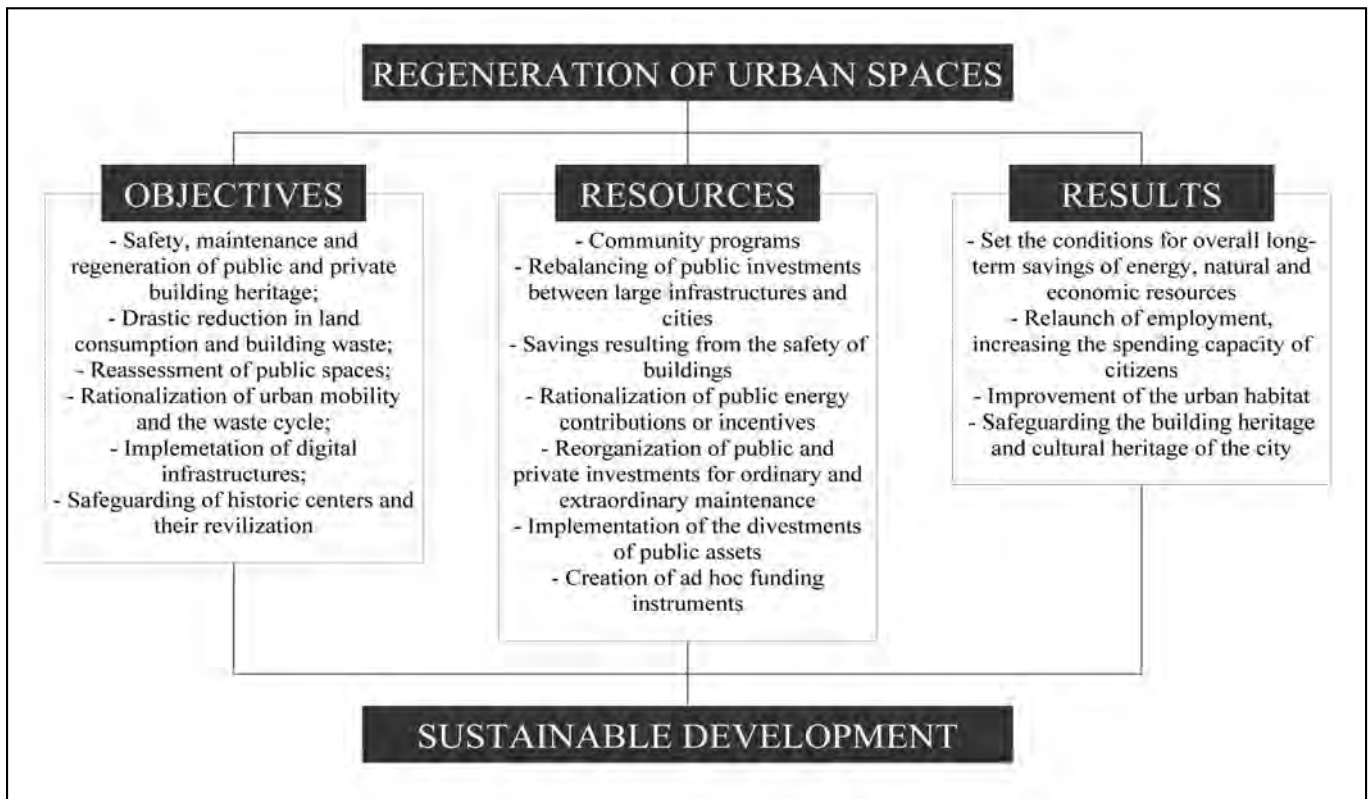


Figure 2 - Regeneration of urban spaces (source: author's elaboration)

of the inhabitants, supporting the valorization of cultural resources, protecting the environmental system, bringing economic development, and so on (Fig. 2) (Lombardi, 2008; Haapio, 2012; Garsia, 2015; Ostanel, 2017; Brunetta et al., 2018).

A second perspective that appears useful for achieving objective 11 is the approach offered by ecosystem services, which allow us to understand the benefits that natural systems offer to human society to satisfy their well-being in the form of goods and services (Caldarice and Salata, 2019). According to this point of view, the measurement and evaluation of the goods and services offered by the ecological-natural systems becomes very important, not only from the bio-physical point of view, but also from the economic point of view so that these values are included and considered in decision-making processes concerning the transformation of the city (MEA, 2005; Angilella et al., 2016; Bentivegna, 2016; Diaz-Sarachaga and Jato-Espino, 2019).

A third direction on which it is fundamental to reason is the one proposed by the circular economy.

According to the definition of the Ellen MacArthur Foundation, circular economy is a generic term to define an

economy designed to be able to regenerate on its own. This definition is based on the existence of two types of material flows: biological ones, able to be reintegrated into the biosphere, and technical ones, destined to be revalued without entering the biosphere (Figure 3). This is an overall and radical rethinking, based on the over-exploitation of natural resources and oriented towards the objective of maximizing profits through the reduction of production costs. Adopting a circular approach means reviewing all stages of production and paying attention to the entire supply chain involved in the production cycle, through the enhancement not only of natural capital (primary resources and environmental impacts), but also of the social (work and wellness) and economic one (investments and revenues) (Enea, 2019; Ellen MacArthur Foundation, 2019).

#### 4. CONCLUSIONS AND FUTURE PERSPECTIVES

It is clear that the concept of sustainable development has become the paradigm of development interventions since several decades, giving a centrality to environmental issues (Mondini, 2010).

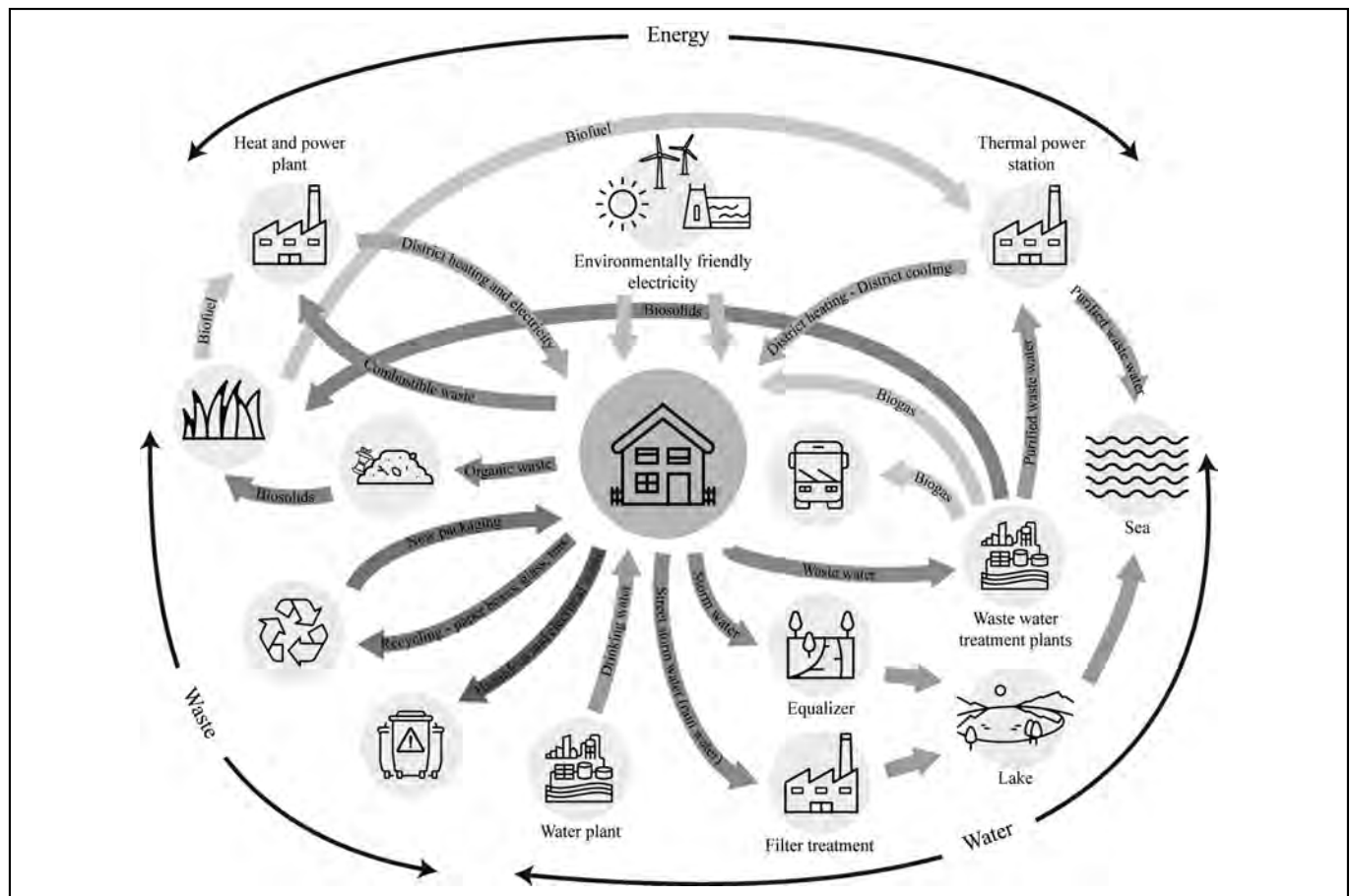


Figure 3 - The concept of circular economy (source: elaboration by Iveroth et al., 2013)

**Table 2 - Tab. Main methodologies for sustainability assessment**  
(source: elaboration by Mondini, 2009)

Phases	Content	Instruments
Knowledge phase	<p>The subjects involved:</p> <ul style="list-style-type: none"> <li>• Analysis of public and private interests</li> <li>• Analysis of current and potential loans</li> <li>• Analysis of transformation projects</li> </ul> <p>The socio-economic framework:</p> <ul style="list-style-type: none"> <li>• Territorial indicators</li> <li>• Economic indicators</li> <li>• Social indicators</li> <li>• Cultural tourism</li> </ul> <p>The environmental-cultural framework:</p> <ul style="list-style-type: none"> <li>• Risk card and territorial constrains</li> <li>• Environmental resources</li> <li>• Tangible and intangible assets</li> <li>• Infrastructures and accessibility</li> <li>• Map of socio-cultural events</li> </ul>	<ul style="list-style-type: none"> <li>• Stakeholders Analysis</li> <li>• Analysis of real estate values</li> <li>• Reference regulatory framework</li> <li>• Socio-economic surveys</li> <li>• Estimate of Total Economic Value (TEV)</li> <li>• Cluster Analysis</li> </ul>
Concertation phase	<ul style="list-style-type: none"> <li>• Evaluation of critical issues, opportunities and weaknesses</li> <li>• Rules for the formation of a concertation table</li> <li>• Techniques for accompanying decision-making processes</li> <li>• Activation of the public participation process</li> </ul>	<ul style="list-style-type: none"> <li>• SWOT analysis</li> <li>• Interviews and questionnaires</li> <li>• Focus group</li> <li>• Contingency analysis</li> </ul>
Strategic definition of objectives phase	<ul style="list-style-type: none"> <li>• Definition of short-term objectives</li> <li>• Definition of long-term objectives</li> <li>• Verification of consistency of the objectives with the European Union</li> </ul>	<ul style="list-style-type: none"> <li>• Multicriteria Analysis</li> </ul>
Systemic evaluation phase	<ul style="list-style-type: none"> <li>• Analysis of impacts</li> <li>• Evaluation of alternatives</li> <li>• Definition of mitigation measures</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental Impact Assessment (EIA)</li> <li>• Strategic Environmental Assessment (SEA)</li> <li>• Ecological Impact Assessment</li> <li>• Cost-Benefit Anlysis (CBA)/Discounted Cash-Flow Analysis (DCFA)</li> <li>• Social Return on Investment (SROI)</li> <li>• Community Impact Evaluation (CIE)/Community</li> <li>• Impact Assessment (CIA)</li> <li>• Integrated Pollution Prevention and Control (IPPC)</li> <li>• Life Cycle Assessment (LCA)/Life Cycle Cost (LCC)</li> <li>• Evaluation of the visual impact on landscape</li> <li>• Agent-Based Model (ABM)</li> <li>• System Dynamics Model (SDM)</li> <li>• Spatial Econometric Models (SEM)</li> <li>• Fuzzy Cognitive Map (FCM)</li> </ul>
Monitoring phase	<ul style="list-style-type: none"> <li>• Objectives</li> <li>• Monitoring procedures</li> <li>• Knowledge system</li> <li>• Timing and implementation methods</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring by objectives</li> <li>• Monitoring by resources</li> <li>• Monitoring by actions</li> <li>• Monitoring the state of the environment</li> <li>• DPSIR model</li> </ul>

**Table 3 - Main systems for assessing sustainability at the urban level**  
(source: elaboration by Science for Environment Policy, 2018)

Evaluation system	Organization	References
<b>BREEAM Communities</b>	Building Research Establishment Environmental Assessment Methodology (BREEAM)	<a href="https://www.breeam.com/">https://www.breeam.com/</a>
<b>China Urban Sustainability Index</b>	Urban China Initiative	<a href="http://www.urbanchinainitiative.org/en/resources/report.html">http://www.urbanchinainitiative.org/en/resources/report.html</a>
<b>City Blueprint</b>	Waternet Amsterdam; KWR Water Cycle Research Institute	<a href="https://www.kwrwater.nl/en/tools-producten/city-blueprint/">https://www.kwrwater.nl/en/tools-producten/city-blueprint/</a>
<b>Eco<sup>2</sup> Cities Initiative</b>	World Bank	<a href="http://siteresources.worldbank.org/INTURBAN-DEVELOPMENT/Resources/336387-1270074782769/Eco2CitiesBookWeb.pdf">http://siteresources.worldbank.org/INTURBAN-DEVELOPMENT/Resources/336387-1270074782769/Eco2CitiesBookWeb.pdf</a>
<b>EEA Urban Metabolism Framework</b>	European Environment Agency	<a href="http://ideas.climatecon.tu-berlin.de/documents/wpaper/CLIMATECON-2011-01.pdf">http://ideas.climatecon.tu-berlin.de/documents/wpaper/CLIMATECON-2011-01.pdf</a>
<b>European Green Capital Award</b>	European Commission	<a href="http://ec.europa.eu/environment/european-green-capital/about-the-award/">http://ec.europa.eu/environment/european-green-capital/about-the-award/</a>
<b>European Green City Index</b>	Economist Intelligence Unit; Siemens	<a href="https://www.siemens.com/press/pool/de/events/corporate/2009-12-Cop15/European_Green_City_Index.pdf">https://www.siemens.com/press/pool/de/events/corporate/2009-12-Cop15/European_Green_City_Index.pdf</a>
<b>European Green City Tool</b>	European Union	<a href="http://ec.europa.eu/environment/urban/tool.htm">http://ec.europa.eu/environment/urban/tool.htm</a>
<b>European Green Leaf Award</b>	European Union	<a href="http://ec.europa.eu/environment/european-green-capital/europeangreenleaf/">http://ec.europa.eu/environment/european-green-capital/europeangreenleaf/</a>
<b>Eurostat Sustainable Development Indicators</b>	Eurostat	<a href="https://ec.europa.eu/eurostat/web/sdi/sustainable-cities-and-communities">https://ec.europa.eu/eurostat/web/sdi/sustainable-cities-and-communities</a>
<b>Global City Indicators Program</b>	Global City Indicators Facility	<a href="https://www.citiesalliance.org/">https://www.citiesalliance.org/</a>
<b>Green Cities Programme</b>	OECD	<a href="http://www.oecd.org/regional/greening-cities-regions/46811501.pdf">http://www.oecd.org/regional/greening-cities-regions/46811501.pdf</a>
<b>Green Star</b>	Green Building Council of Australia	<a href="https://new.gbca.org.au/green-star/">https://new.gbca.org.au/green-star/</a>
<b>Indicators for Sustainability</b>	Sustainable Cities International	<a href="https://sustainablecities.net/">https://sustainablecities.net/</a>
<b>LEED for Neighbourhood Development (LEED-ND)</b>	Leadership in Energy and Environmental Design (LEED)	<a href="https://www.nrdc.org/sites/default/files/citizens_guide_LEED-ND.pdf">https://www.nrdc.org/sites/default/files/citizens_guide_LEED-ND.pdf</a>
<b>National Australian Built Environment Rating System (NABERS)</b>	Government of Australia	<a href="https://www.nabers.gov.au/">https://www.nabers.gov.au/</a>
<b>Reference Framework for Sustainable Cities (RFSC)</b>	RFSC	<a href="http://rfsc.eu/">http://rfsc.eu/</a>
<b>SDEWES Index</b>	International Centre for Sustainable Development of Energy, Water and Environment Systems (SDEWES) Index	<a href="http://www.piran2016.sdewes.org/sdewes_index.php">http://www.piran2016.sdewes.org/sdewes_index.php</a>

**Table 3 - Main systems for assessing sustainability at the urban level**  
(source: elaboration by Science for Environment Policy, 2018)

Evaluation system	Organization	References
<b>STAR Community Rating System</b>	Sustainability Tools for Assessing and Rating Communities (STAR)	<a href="http://www.starcommunities.org">http://www.starcommunities.org</a>
<b>Urban Audit Cities Statistics</b>	Eurostat	<a href="https://ec.europa.eu/eurostat/web/regions-and-cities">https://ec.europa.eu/eurostat/web/regions-and-cities</a>
<b>Urban Ecosystem Europe – Informed Cities</b>	International Council for Local Environmental Initiatives (ICLEI); Ambiente Italia	<a href="http://informedcities.eu/">http://informedcities.eu/</a>
<b>Urban Indicators Guideline</b>	UN Human Settlements Programme	<a href="https://unhabitat.org/urban-indicators-guidelines-monitoring-the-habitat-agenda-and-the-millennium-development-goals/">https://unhabitat.org/urban-indicators-guidelines-monitoring-the-habitat-agenda-and-the-millennium-development-goals/</a>
<b>Urban Sustainability Indicators</b>	European Foundation for the Improvement of Living and Working Conditions	<a href="https://www.eurofound.europa.eu/sites/default/files/ef_files/pubdocs/1998/07/en/1/ef9807en.pdf">https://www.eurofound.europa.eu/sites/default/files/ef_files/pubdocs/1998/07/en/1/ef9807en.pdf</a>

The sustainable development approach, applied to urban and territorial planning and transformations, brings implications and needs to which correct and effective answers are not always given.

First of all, the need to assess sustainability. As seen in the paper, the assessment of sustainability must be carried out in an interdisciplinary perspective. In fact, only with the support of integrated approaches, the level of uncertainty in these contexts can be reduced, making it possible to make more conscious decisions about possible long-term impacts (Cecchini and Bleicic, 2016).

A fundamental effective response to this need is represented by the continuous training of practitioners working in this field. This could be made possible by focusing on greater collaboration between professional associations and universities, in order to provide experts able to address these issues with awareness and with adequate knowledge of the evaluation methodologies.

The ultimate goal must be to create a network for the provision of knowledge and skills to achieve the common goal of this development.

\* **Giulio Mondini**, Department of Regional and Urban Studies and Planning (DIST), Politecnico di Torino  
e-mail: [giulio.mondini@polito.it](mailto:giulio.mondini@polito.it)

## Bibliography

AMEEN R.F.M., MOURSHED M., LI H., *A critical review of environmental assessment tools for sustainable urban design*, Environmental Impact Assessment Review, Vol. 55, 2015, pp. 110-125.

ANGILELLA S., BOTTERO M., CORRENTE S., FERRETTI V., GRECO S., LAMI I.M., *Non Additive Robust Ordinal Regression for urban and territorial planning: an application for siting an urban waste landfill*, Annals of Operations Research, Vol. 245, n. 1-2, 2016, pp. 427-456. doi: 10.1007/s10479-015-1787-7

AMENDOLA G., *The Just City*, Valori e Valutazioni, n. 17, 2016, pp. 13-14.

BECCHIO C., BOTTERO M., CORGNATI S., DELL'ANNA F., *Decision making for sustainable urban energy planning: an integrat-*

*ed evaluation framework of alternative solutions for a NZED (Net Zero-Energy District) in Turin*, Land Use Policy, Vol. 78, 2018, pp. 803-817.

BENTIVEGNA V., *Dialogue and transparency in decision-making*, Valori e Valutazioni, n. 17, 2016, pp. 25-28.

BOND A., MORRISON-SAUNDERS A., POPE J., *Sustainability assessment: the state of the art*, Impact Assessment and Project Appraisal, Vol. 30, n. 1, 2012, pp. 53-62.

BOOTH C., HAMMOND F.N., LAMOND J., DAVID G., *Solutions for Climate Change Challenges in the Built Environment*, John Wiley & Sons, Incorporated, 2011.

BOTTERO M., MONDINI G., *Valutazione e Sostenibilità. Piani, Programmi e Progetti*, Valori e Valutazioni, Vol. 3, 2009, pp. 125-126.



- BOTTERO M., DATOLA G., MONACO R., *The Use of Fuzzy Cognitive Maps for Evaluating the Reuse Project of Military Barracks in Northern Italy*, In: Calabrò F., Della Spina L., Bevilacqua C. (eds) *New Metropolitan Perspectives*. ISHT 2018a. *Smart Innovation, Systems and Technologies*, Vol. 100, Springer, Cham.
- BOTTERO M., BRAVI M., DELL'ANNA F., MONDINI G., *Valuing buildings energy efficiency through Hedonic Prices Method: Are spatial effects relevant?*, *Valori e Valutazioni*, Vol. 21, 2018b, pp. 27-39.
- BRUNETTA G., SALIZZONI E., BOTTERO M., MONACO R., ASSUMMA V., *Measuring Resilience for Territorial Enhancement: An Experimentation in Trentino*, *Valori e Valutazioni*, n. 20, 2018, pp. 69-78.
- CALDARICE O., SALATA S., *Ecosystem Service Assessment in Land Use Planning Decreasing Territorial Vulnerability. A Critical Exploration of Planning Problems Starting from the Land Take Regulation in Piedmont Region, Italy*, *Valori e Valutazioni*, n. 22, 2019, pp. 67-83.
- CECCHINI A., BLECIC I., *Verso una pianificazione antifragile. Come pensare al futuro senza prevederlo*, FrancoAngeli, Milano, 2016.
- COSTANZA R., DALY L., FIORAMONTI L. ET AL, *Modelling and measuring sustainable wellbeing in connection with the UN Sustainable development Goals*, *Ecological Economics*, Vol. 130, 2016, pp. 350-355.
- D'ALPAOS C., BRAGOLUSI P., *Multicriteria prioritization of policy instruments in buildings energy retrofit*, *Valori e Valutazioni*, Vol. 21, 2018, pp. 15-25.
- DIAZ-SARACHAGA J.M., JATO-ESPINO D., *Do sustainable community rating systems address resilience?*, *Cities*, Vol. 93, 2019, pp. 62-71.
- ELLEN MACARTHUR FOUNDATION, *Circular economy in cities. Project guide*, 2019 (scaricabile dal sito [https://www.ellen-macarthurfoundation.org/assets/downloads/CE-in-Cities-Project-Guide\\_Mar19.pdf](https://www.ellen-macarthurfoundation.org/assets/downloads/CE-in-Cities-Project-Guide_Mar19.pdf), consultato on line il 20 maggio 2019)
- ENEA, *Rapporto sull'economia circolare*, 2019 (scaricabile dal sito <https://circulareconomynetwork.it/wp-content/uploads/2019/02/Rapporto-sulleconomia-circolare-in-Italia-2019.pdf>, consultato on line il 20 maggio 2019)
- FATTINNANZI E., *The quality of the city. The role of evaluation in methodologies to the preparation of plans and projects*, *Valori e Valutazioni*, Vol. 20, 2018, pp. 3-12.
- FIGUEIRA J., GRECO S., EHRGOTT M., *Multiple Criteria Decision Analysis. State of the Art Survey*, Springer, New York, 2005.
- GARSIA L., *Abitare la rigenerazione urbana. La misura della città e della casa nel XXI secolo*, Gangemi editore, Roma, 2015.
- GIRARD F. L., NIKKAMP P., *Le valutazioni per lo sviluppo sostenibile della città e del territorio*, Franco Angeli, Milano, 1997.
- HAAPIO A., *Towards sustainable urban communities*, *Environmental Impact Assessment Review*, Vol. 32 , n. 1, 2012, pp. 165-169.
- HABITAT\_III, *New Urban Agenda*, 2016. Retrieved from <https://habitat3.org/the-new-urban-agenda>
- IPCC, *Climate change 2014 mitigation of climate change*, Cambridge University, 2014. [https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc\\_wg3\\_ar5\\_full.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_full.pdf)
- KOSKO B., *Fuzzy Cognitive Maps*, in "Int. J. Man. Mach. Stud", n. 24, 1986, pp. 65-75.
- LAFRATTA P., *Strumenti innovativi per lo sviluppo sostenibile*, FrancoAngeli, Milano, 2004.
- LOMBARDI P., *Riuso edilizio e rigenerazione urbana. Innovazione e partecipazione*, Celid, Torino, 2008.
- MI Z., GUAN D., LIU Z., LIU J., VIGUIÈ V., FROMER N., WANG Y., *Cities: the core of climate change mitigation*, *Journal of Cleaner Production*, 2019, pp. 582-589.
- MONDINI, G., *Metodologie di valutazione per la sostenibilità*, Studi Territoriali, Loffredo Editore, 2010.
- MONDINI G., *Integrated assessment for the management of new social challenges*, *Valori e Valutazioni*, n. 17, 2016, pp. 15-17.
- MUNDA G., *Multicriteria evaluation in a fuzzy environment. Theory and applications in ecological economics*, Physica – Verlag, Heidelberg, 1995.
- UN - UNITED NATIONS, *Report of the World Commission on Environment and Development: Our Common Future*, 1987.
- UN - UNITED NATIONS, *The Millennium Development Goals Report, 2015a* (scaricabile dal sito [https://www.un.org/millenniumgoals/2015\\_MDG\\_Report/pdf/MDG%202015%20rev%20\(July%201\).pdf](https://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%201).pdf), consultato on line il 20 maggio 2019)
- UN - UNITED NATIONS, *Transforming our world: the 2030 Agenda for Sustainable development*, 2015b.
- OSTANEL E., *Spazi fuori dal comune. Rigenerare, includere, innovare*, Studi urbani e regionali, FrancoAngeli, Milano, 2017.
- ROBERTS P., HUGH S., *Urban regeneration: A handbook*, Sage Publication, 2000.
- SCIENCE FOR ENVIRONMENT POLICY, *Indicators for sustainable cities*, In-depth Report 12, Produced for the European Commission DG Environment by the Science Communication Unit, UWE, Bristol, 2018 (scaricabile dal sito <http://ec.europa.eu/science-environment-policy>, consultato on line il 20 maggio 2018)
- STELLIN G., ROSATO P., *La valutazione economica dei beni ambientali. Metodologia e casi di studio*, Città Studi edizioni, Milano, 1998.
- TROSSERO E., LOMBARDI P., *L'indicatore di sostenibilità energetica per valutare la sostenibilità urbana: un'analisi comparativa di "eco-distretti" urbani in Europa*, *Valori e Valutazioni*, Vol. 11, 2013, pp. 99-108.
- UN - HABITAT, *Urbanization and development: emerging futures*, World cities report, 2016 (scaricabile dal sito <https://www.unhabitat.org/wp-content/uploads/2014/03/WCR-%20Full-Report-2016.pdf>, consultato on line il 20 maggio 2019)