

Project challenges: sustainable development and urban resilience

edited by
DANIELE FANZINI, ANDREA TARTAGLIA,
RAFFAELLA RIVA



Project challenges: sustainable development and urban resilience fosters a multidisciplinary discussion on the role of the architectural project for implementing the Sustainable Development Goals of the 2030 UN Agenda. The collected contributions of researchers and important stakeholders reflect on the necessity to operate in the perspective of finding sustainable development alternatives and resilient responses to changes, offering a wide range of keys for reading and interpreting phenomena and challenges that connote the contemporaneity at different scales, from global policies to local interventions. Complex challenges in which environmental, cultural, social, and economic aspects seamlessly intertwine.

The environmental technological project becomes an element of synthesis of the needs and resources of the territories and the local communities. Since the environmental, landscape, and cultural resources are largely non-renewable, they have to be used with awareness and responsibility, going beyond the concept of protection in itself and moving in the direction of the safeguard and transformation, in close continuity with the context of reference and in line with the limits imposed by the fragility of the assets themselves.

The result is a systemic approach to the issues of sustainable development and urban resilience, realised through the implementation of innovative processes for the enhancement, integration, regeneration, and inclusion of the environmental, cultural, social, and economic heritage.

Daniele Fanzini

Architect, with a PhD in “Technical Innovation and Architectural Design”, he is associate professor of Architectural Technology at the *Politecnico di Milano*, Department of Architecture, Built environment and Construction engineering. He is interested in design processes for the innovation and transformation of the built environment.

Andrea Tartaglia

Architect, with a PhD in “Technical Innovation and Architectural Design”, he is associate professor of Architectural Technology at the *Politecnico di Milano*, Department of Architecture, Built environment and Construction engineering. His research activity is focused on the subject of innovation at three levels: the regulatory and procedural, the qualification of processes and products and that of environmental sustainability.

Raffaella Riva

Architect, with a PhD in “Design and Technologies for Cultural Heritage”, she is assistant professor of Architectural Technology at the *Politecnico di Milano*, Department of Architecture, Built environment and Construction engineering. She conducts researches with reference to the contents of environmental design, with respect to the issues of governance, and the enhancement of the landscape and cultural heritage for local development.

Book series STUDI E PROGETTI

Project challenges: sustainable development and urban resilience

edited by
Daniele Fanzini, Andrea Tartaglia, Raffaella Riva


**MAGGIOLI
EDITORE**

Book series STUDI E PROGETTI

directors *Fabrizio Schiaffonati, Elena Mussinelli*

editorial board *Chiara Agosti, Giovanni Castaldo, Martino Mocchi, Raffaella Riva*

scientific committee *Philippe Daverio, Giulio Giorello, Francesco Karrer, Jan Rosvall*

edited by

Daniele Fanzini, Andrea Tartaglia, Raffaella Riva

revised and translated by

Filedelfja Musteqja, Francesca Pandolfi

The text has been subjected to blind peer review.

Cover:

The Sustainable Development Goals for the project challenges.

Elaboration by Raffaella Riva.

ISBN 9788891632487

© Copyright of authors.

Published by Maggioli Editore in the month of December 2019.

Maggioli Editore is a trademark of Maggioli Spa

Company with certified quality system Iso 9001:2000

47822 Santarcangelo di Romagna (RN) • Via del Carpino, 8

e-mail: clienti.editore@maggioli.it

All rights reserved.

INDEX

| | |
|---|----|
| Foreword | 7 |
| <i>Stefano Della Torre (Politecnico di Milano)</i> | |
| Introduction - <i>Daniele Fanzini, Andrea Tartaglia, Raffaella Riva</i> | 9 |
| Prospects of innovation in the project between sustainable development and resilience - <i>Elena Mussinelli</i> | 11 |
| 1 Architecture, city and territory | 17 |
| 1.1 Green economy: a sustainable future for buildings, cities and territories - <i>Interview by Fabrizio Tucci to Edo Ronchi</i> | 19 |
| 1.2 Sustainable project towards green architectures and cities <i>Fabrizio Tucci</i> | 28 |
| 1.3 Green products for sustainable architectures - <i>Ernesto Antonini</i> | 38 |
| 1.4 Green economy and the sustainable project - <i>Maria Cristina Forlani</i> | 46 |
| 2 Peri-urban and rural territories | 53 |
| 2.1 Culture, project and environment for the development of rural and suburban territories - <i>Mario Losasso</i> | 55 |
| 2.2 The valorisation of the resource system in rural and peri-urban areas <i>Andrea Tartaglia</i> | 62 |
| 2.3 The experience of Patrimonio Ca' Granda Foundation: social report and environmental impacts - <i>Marco Giachetti, Davide Cerati</i> | 69 |
| 2.4 Project for the development of rural and peri-urban territories: district networks and models - <i>Daniele Fanzini</i> | 73 |
| 3 Cultural landscapes | 85 |
| 3.1 The role of culture in sustainable development projects <i>Raffaella Riva</i> | 87 |
| 3.2 Reconsidering museums and ecomuseums in a globalized, changing world - <i>Alberto Garlandini</i> | 96 |

| | | |
|------|---|-----|
| 3.3 | Practicing sustainability: the ecomuseum challenge <i>Hugues de Varine</i> | 105 |
| 3.4 | The contribution of Italian ecomuseums to shape the future of landscape - <i>Raul Dal Santo</i> | 112 |
| 4 | Research experiences | 121 |
| 4.1 | A sustainable model of urban governance - <i>Irina Rotaru</i> | 123 |
| 4.2 | Collective (re)activation - <i>Gianpiero Venturini</i> | 135 |
| 4.3 | Sharing economy and emerging housing behaviours. Diffusive re-activation of historical urban centres heritage - <i>Joseph Di Pasquale</i> | 142 |
| 4.4 | The Green Heart of Novara: the public spaces system from the Castle to the Children's Playground to the City's Boulevards <i>Matteo Gambaro</i> | 149 |
| 4.5 | A project-process for sustainable regeneration of the abandoned military areas: the Piacenza experience - <i>Matteo Tagliafichi</i> | 159 |
| 4.6 | Overview on the sustainability of energy retrofit choices for built heritage conservation - <i>Alessia Buda</i> | 168 |
| 4.7 | Impact investing. Innovative financial tool to support Real Estate Project - <i>Genny Cia</i> | 177 |
| 4.8 | Design the rural landscape. LandsARE Landscape architectures in European rural areas - <i>Roberto Bolici</i> | 185 |
| 4.9 | The role of cultural heritage in contemporary historic city renew: heritage-led urban transformation - <i>Xu Lu</i> | 193 |
| 4.10 | Holistic approach for cultural heritage: co-creative methods to bring together various parties - <i>Anastasiia Sedova</i> | 203 |
| 4.11 | Cultural heritage as a strategic resource for tourism attractiveness and socio-economic development - <i>Elisa Panzera</i> | 211 |
| 4.12 | The enhancement of the vestiges of the Great War through scenarios perspectives - <i>Joel Aldrighettoni</i> | 219 |
| 4.13 | How to use digital data in the idea of cultural heritage <i>Cinzia Tommasi</i> | 227 |
| 4.14 | Services of cultural heritage structures enhance the resilience <i>Zehra Irem Turksezer</i> | 237 |
| 4.15 | The seismic protection of Italian built cultural heritage: the case-study of Salò - <i>Enrica Brusa</i> | 246 |
| 4.16 | Post-earthquake damaged churches: a temporary valorisation <i>Gessica Sferrazza Papa</i> | 253 |

2.2 THE VALORISATION OF THE RESOURCE SYSTEM IN RURAL AND PERI-URBAN AREAS

*Andrea Tartaglia**

The role of green areas

Over the centuries, mankind has progressively given new values and meanings to the actions of using and modifying the green components in the territory, both agricultural and urban. Different cultures and societies have moved from considering the natural elements as a source of great utility with respect to the primary productive system, to identifying them also as the main tool for creating aesthetic and landscape values through a planned and managed use inside towns also. In this scenario, parks and gardens for example became symbols of beauty and of wealth and power. Green, water, sculptural elements have been shaped and organized following outcomes to express artificiality or looking to the naturalness of the result according to the different cultures and historical periods. Used in open spaces, but also in buildings - think of the famous hanging gardens of Babylon - green is not only a natural element, but also a technical component for the use by landscape architects, green architects and architectural designers.

Nowadays, in addition to the productive and aesthetic values, the environmental values and the impact in terms of wellbeing have become a more and more central issue, also stressing the systemic role of natural element and the importance of ecological connectivity. In particular, it is quite recent the understanding of the so called “ecosystem services”. In fact, the ecological devastations due to the industrial production and the new ways of life in the modern era that are producing also phenomena like climate change and widespread modifications in the uses of soil, are pushing the international community in concentrating policies and in investing resources toward new ways of using and valorising our territories.

* Andrea Tartaglia, associate professor in Architectural Technology, Department of Architecture, Built environment and Construction engineering, *Politecnico di Milano*.

The ecological issue

The ecological understanding of how the territories and the world in general “work” have given a new meaning to the need of a multiscale and systemic approach to the management of intervention and transformations.

«Land-use changes and landscape transformation processes associated to urban expansion, agricultural development and industrial activities have important consequences on the environment. In particular, anthropogenic impacts may result in a reduction of various benefits that humans gain from nature through the so-called ecosystem services [...] Understanding the ecological foundation of the ecosystem service is of critical importance to ensure their preservation. [...] Recently, economic evaluation showed that the global accounting value of ecosystem service flows and natural capital stocks largely exceeds the global gross domestic product» (Melià et al., 2018, p. 50).

Because of its nature, the ecological issue is not a specialist problem but a transversal one that concerns every activity carried out by human beings. The normal tools introduced in the last decades by the European level to improve the sustainability of programmes, plans and projects have had a very limited impact on the general ecological qualities of the use of territories. SEA (Strategic Environmental Assessment)¹ and EIA (Environmental Impact Assessment)² have been introduced *«to provide a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation of projects, plans and programmes with a view to reduce their en-*

¹ The SEA is a mandatory process that must accompany the preparation and approval of plans and programmes in order to control and verify the outcomes of the choices with respect to environmental issues. In particular, the SEA provides for a wide and continuous involvement of the various competent authorities, stakeholders and the population. It focuses on the need to assess the repercussions of the various feasible alternatives and also to define and then implement a procedure for monitoring the results of the planning and planning choices, to be able to intervene when the results were not in line with the forecasts. At European Community level, this procedure was introduced with directive 2001/42/EC. In Italy the transposition took place with the legislative decree 3rd April 2006, n. 152 “Environmental regulations”.

² Experienced for the first time in 1969 in the United States with the National Environment Policy Act (NEPA), the EIA is an authorization procedure aimed at controlling and minimizing the environmental impact of projects, and introducing any mitigation and/or compensatory measures. In Europe, EIA was introduced for the first time with the directive 1985/337/EEC. In Italy the transposition took place with the law 8th July 1986, n. 349, which also established the Ministry of the Environment. Initially born to be applied to major infrastructural interventions or to structures destined to host particularly risky functions for the potential negative effects on the environment, progressively its application has also been extended to more contained interventions, delegating responsibility to gradually lower administrative levels. Consequently, the authorization powers can be community, national, regional, provincial or even municipal. The procedure involves the preparation of an environmental impact study, which, together with the project to which it refers, must also be made available to citizens, which can express themselves on the merits of the contents before the competent administration expresses its decision with respect to the authorization or refusal to carry out the work.

vironmental impact»³, but the Italian experience cannot be considered so successful. All too often, these tools and procedures have been considered as bureaucratic obligations. Only in rare cases, a territorial plan has been deeply modified after the conclusion of the SEA. Moreover, often the most significant impact on the environment are not caused by big projects that must undergo to an EIA, but by the sum of many small interventions. An evidence of this can be easily found in the recent publication edited by ISPRA with regard to the soil sealing processes in Italy (Munafò, 2018). The lack of a national policy really focused on a more adequate use of our territories is constantly jeopardizing our resources. In fact, the most impacting element that in the last five years was able to contain the soil sealing has been the economic crisis that has hit in particular the building sector. The crisis has reduced 80% of the annual rate of consumption of territory compared to the period of economic growth that has characterized the beginning of the century. In any case, the process goes on and it is important to notice that the analysis of the 2017 data highlights that often the major consumption has involved small and medium municipalities.

Territorial and administrative fragmentation

In fact, comparing the situation in the different European nations, the urban dispersion is an issue that is particularly evident in Italy. This has a multiplier effect on negativities related to land consumption, especially in a systemic view of the Italian territory.

«The effect of land consumption does not only impact the areas directly affected by the coverage artificial but also the areas adjacent to them. In fact, it is necessary to consider not only the direct effects that the consumption of soil has on ecosystems, but also indirect ones, which influence some services important ecosystems, such as climate or hydrological regulation» (Congedo et al., 2018, p. 55, translated by the author).

The fragmentation is a direct result of the lack of coordination among the different administrations in charge of governing the transformation of the territories. Each intervention is often considered as an independent variable and not as part of a wider scenario of multiple transformations. A correct management and implementation of the ecosystem services must overcome administrative boundaries and specialisms.

The first level of this discontinuity can be identified in the segmentation of the municipal territories in urban, peri-urban and rural areas. Actually, these titles identify only a different roles and functions in a system in which all the components are interdependent. If the urban areas are more devoted to provide economic and social services for the population, the more natural rural areas guarantee more ecosystem services. Services that are fundamental also for the

³ See: http://ec.europa.eu/environment/eia/index_en.htm (accessed December 2018).

quality of the built urban areas. Thus, the peri-urban areas so are not only the moment of transition between artificial and green landscape, but also an important interface to create relations and continuity for the management and the improvement of territorial ecosystem services. The correct management and transformation of rural and peri-urban areas is fundamental for the resilience of territories and the towns themselves. It is not only a matter of stopping the soil consumption and territorial fragmentation, but of soil use. In fact, the soil sealing is probably the most impacting intervention in a peri-urban/rural area, but this does not mean that a not sealed soil is always a positive use in terms of ecosystem services.

Soil consumption and national policies

With regard to the well-known issue of soil consumption, the attention is normally focused on the lack of the promulgation of a specific regulation⁴. Currently, some Regions have anticipated a national law approving specific regulation to stop or at least to contain this erosive process that it is quite impossible to reverse. However, if on one side there are a lot of public proclamation and few legislative acts, on the other side it is quite evident that in Italy the majority of the fiscal, economic and safeguard policies tend to push toward the use of not built areas. From a pure economic point of view to build in a free area is always cheaper and simpler than to revamp or rebuilt where there is an already existing construction. The reasons are multiple: the problems of reclamation of soils and the management of the rubble; the different costs and the level of unknown risks between new construction and refurbishment; the pulverization of properties in built areas; the different land rent of a free area compared to one occupied. Not last, the endemic difficulty in Italy in modifying or worst demolishing the existing. It is quite impossible to make a distinction between cultural heritage and no longer useful build product. The lack of use and role in the society is often not perceived as a problem. A situation of abandoning is often preferred to any kind of intervention and transformation and this is much truer when we act in the rural environment. In fact, the land recycling is a process that in Italy happens only in situations of particularly high land rent, such as the urban territories of Milan and Rome. The urban densification, that is the direction identified by the EU to contain the soil consumption, can be achieved only

⁴ The first law proposal purposely aimed at addressing this issue dates back to 2012 on the part of the Minister for Agricultural, Food and Forestry Policies. This proposal identified in the agricultural areas the cornerstone of the protection of the territory and in fact it defined the consumption of soil as the reduction of agricultural land due to sealing, urbanization and construction not related to agricultural activity. In 2016, a new proposal broadens the scope of action and pursues the “Containment of land use and the reuse of built-up land” to pursue the community goal of zeroing up land use by 2050. At the moment, however, none of these proposals has ever become executive.

in a frame of policies, tools and incentives that in parallel push the investment in that direction and that valorise every intervention able to improve the environmental qualities and a compatible use of not sealed areas. If it is true that:

«regardless of the greater or lesser attention placed on planning, for essentially financial reasons, the territory is however invested by a process of creating property values above all private, with a process that takes place at the expense of natural goods that are irreproducible without proper consideration of the margins of tolerability of this irreversible consumption»⁵.

It is evident that the soil sealing cannot be stopped or reversed only forbidding the occupation of new areas as some regional and local regulation are trying to do. In any case, it is important to move from the generalist approach of soil consumption to the most complex approach of soil use.

The role of rural and peri-urban areas

The awareness of the importance of ecosystem services and their value also in economic terms, adds today to the understanding of being able to contribute with appropriate interventions for the transformation of land use not only to the enhancement of existing ecosystem services, but also to the creation of new ones. In this scenario, the role of peri-urban and rural areas acquires a central position also considering their possible positive impacts on urban areas. In particular, rural and peri-urban areas must not be considered as reality to be safeguarded or frozen. They are not only one of the most representative areas to handle the problems with regard to the relations between built environment and natural elements, they represent an important opportunity to implement the uses of soil toward most sustainable and efficient ways to valorise the existing local resources. It is important to guarantee a continuity in the management of these territories, avoiding processes of abandoning and fragmentation.

Nowadays, urban areas are in the centre of the common debate because of their negative impact on environment, the high demand of resources for their functioning and the problem of adaptation toward global phenomena like climate change. The attention of architects and planners aims on improving resilience, transforming cities in sustainable environment, reducing their energy consumption, increasing natural elements and recreating ecosystem services deleted by the past construction models. However, all these solutions can for sure mitigate problems and acute phenomena, but they cannot reverse the global reductions of ecosystem services. We have to consider that, for example in Italy, the consumed soil by urban settlement and infrastructures was in 2017 the 7,65% of the national surface (Munafò & Marinosci, 2018). The national land

⁵ Ombuen, S., *Politiche urbane e incremento del consumo di suolo. Riflessioni di un esperto di urbanistica*, available at: http://ec.europa.eu/environment/land_use/pdf/ombuen.pdf (translated by the author).

use card 2017 by ISPRA stresses that half of the Italian territory has still a rural vocation. This means that only a correct “use” of these surfaces can produce a significant positive impact to compensate the negativities of urban areas.

Towards a more aware design approach

Current policies are pushing toward a more sustainable use of land. Tools and used indicators focus in this direction. However, as it is happening for urban environment, the point is to reverse also in rural and peri-urban areas the progressive fragmentation and loss of ecosystem services. If, from a scientific point of view, the knowledge is quite advanced, planners and architects have not yet developed enough tools and abilities in this direction. The decision-making processes and the consequent projects are usually not developed and then verified on the basis of indicators that have scientific value.

The long-time sustainability of the decisions can be pursued only following performance-based approaches able to integrate environmental, economic, productive and socio-cultural components in peri-urban and rural areas.

«Multifunctionality is an increasingly indispensable feature for these territories that guarantee multiple ecosystem services not only for the local community but also for the relevant urban areas of reference» (Tartaglia et al., 2017, p. 189).

The objectives to be pursued by intervening in these territories can be multiple, for example: reduction of CO₂, of pollutants and of energy consumption; sustainable intensification of agriculture improving in parallel productivity and environmental management; diversification of activities, creation of new professionalism and increase of the social inclusion in rural areas; enhancement of natural areas and increase of biodiversity; recovery and reuse of artefacts and infrastructure with a significant landscape, cultural and historical value; construction of new environmental nets and green and blue infrastructures and reactivation of existing ones.

The acquisition of new shared values for these parts of the territories is the proper answer to the degradation and abandoning processes. As already experimented in heritage area, the relationship between protection and enhancement is very close and it is necessary to connect

«environmental quality with wider-ranging debate about quality use of land, also taking into account considerations regarding intangible aspects linked with perception, recognition, identity and a sense of belonging» (Mussinelli, 2015, pp. 17-18).

Peri-urban and rural areas represent the new challenge for environmental design. A discipline that has developed a systemic approach to govern coordinated policies and projects integrating management models and composite systems of skills⁶.

⁶ In this regard, refer to a project of ecological, economic and socio-cultural improvement devel-

References

- Congedo, L.; Cavalli, A.; Ciocci, C.; Marinosci, I.; Milano, G.; Strollo, A. & Munafò, M. (2018), “L’impatto del consumo di suolo”, in Munafò, M. (ed), *Consumo di suolo, dinamiche territoriali e servizi ecosistemici - edizione 2018*, report 288, ISPRA (Istituto Superiore per la Protezione e la Ricerca Ambientale), Roma, pp. 55-63.
- Melià, P.; Mari, L. & Gatto, M. (2018), “The role of ecology in landscape design”, in Tartaglia, A. & Cerati, D. (eds), *Design and enhancement of the metropolitan rural territories. Proposals for the South-Abbatense*, Maggioli, Santarcangelo di Romagna, pp. 49-59.
- Munafò, M. & Marinosci, I. (2018), *Territorio. Processi e trasformazioni in Italia*, report 296, ISPRA (Istituto Superiore per la Protezione e la Ricerca Ambientale), Roma.
- Munafò, M. (ed) (2018), *Consumo di suolo, dinamiche territoriali e servizi ecosistemici - edizione 2018*, rapporto 288/2018, ISPRA (Istituto Superiore per la Protezione e la Ricerca Ambientale), Roma.
- Mussinelli, E. (2015), “Themes, scales and goals of environmental design”, in Mussinelli, E. (ed), *Design, technologies and innovation in cultural heritage enhancement*, Maggioli, Santarcangelo di Romagna, pp. 11-32.
- Tartaglia, A. & Cerati, D. (eds) (2018), *Design and enhancement of the metropolitan rural territories. Proposals for the South-Abbatense*, Maggioli, Santarcangelo di Romagna.
- Tartaglia, A.; Cerati, D. & Di Chiara, G. (2017), “Environmental project and enhancement of peri-urban rural territories”, in *Agathón*, vol. 2, pp. 181-190.

oped according to a multi-scale and multi-disciplinary approach typical of the environmental technological design by the Research group “Governance, design and enhancement of the built environment” of the *Politecnico di Milano*, with the support of the technical area of the *Fondazione Sviluppo Ca’ Granda* and of the *del Consorzio di Bonifica Est Ticino*. The project involved the vast rural properties of the *Fondazione Sviluppo Ca’ Granda* present in the south-west of the Milan metropolitan area. The results of this experience have been reported in the following publications: Tartaglia & Cerati, 2018; Tartaglia et al., 2018.