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The fragile/resilience city represents a topic that collects itself all the issues related to the urban risks and referred to the different impacts that an urban system has to face with. Studies useful to improve the urban conditions of resilience are particularly welcome. Main topics to consider could be issues of water, soil, energy, etc..

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METHODS, TOOLS AND BEST PRACTICES.



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THE RESILIENCE CITY/THE FRAGILE CITY. METHODS, TOOLS AND BEST PRACTICES

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RE-SEWING THE URBAN PERIPHERY. A GREEN STRATEGY FOR FONTIVEGGE DISTRICT IN PERUGIA

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ABSTRACT

The present study debates on the issue of urban regeneration in contemporary cities, adopting a strategic vision which includes the use of vegetation and green infrastructure to create a network of public spaces. Especially, urban periphery lacks of public spaces, meaning a public use of urban space for outdoor activities and social networks.

The extraordinary program for the Italian peripheries, addressed to all the metropolitan cities and provincial capitals in 2016, inspired to Renzo Piano idea of "re-sewing" urban fabrics, has been a good opportunity for testing new approaches to urban regeneration. The case study investigated in this study is the financed project for the city of Perugia, which provides different interventions aimed at improving (and developing new) public spaces through vegetation enhancement and a large area destined to vegetable social gardens as a strategy for urban infill. By recovering public spaces with social purpose and providing a comprehensive strategy for aesthetic improvement of the city, the case study provides a representative example, how greening the city may promote together biodiversity conservation and urban regeneration.

KEYWORDS:

Urban Regeneration; Urban Periphery; Urban Infill; Public Spaces; Green Infrastructure.

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重新部署城市周边。

佩鲁贾地区的绿色战略

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摘要

本研究就当代城市的再生问题进行了讨论，采用了包括利用植被和绿色基础设施建立公共空间网络的战略愿景。特别是城市周边缺乏公共空间，这意味着公众要利用城市空间进行户外活动和社交网络。

2016年，Renzo Piano 构想了一项名为“重新部署”城市的非凡计划，针对意大利周边地区的大都会城市和省会城市。这对于检测城市再生的新方法而言是一个很好的机会。本研究调查的案例研究是佩鲁贾市的融资项目，该项目提供不同的干预措施，旨在通过增加植被并将大面积蔬菜园作为城市填充战略来改善（并开发新的）公共空间。案例研究通过恢复具有社会目的的公共空间并提供优化城市美学的综合战略，提供了一个具有代表性的例子，即城市绿化如何能同时促进生物多样性保护和城市再生。

关键词：

城市再生、城市周边、城市填充、公共空间、绿色基础设施

1 INTRODUCTION

The “Extraordinary program for the requalification of urban peripheries”, including a call for proposal addressed to all the metropolitan cities and provincial capitals, entitled *“Notice to present new proposals for the organisation of the Special Program for an intervention to requalify the urban area and the safety of the suburbs”* (DPCM no.127/2016) is a key opportunity to discuss about Italian urban suburbs and about the possible scenarios for a sustainable path of urban growth (Ahvenniemi & al., 2016). Funding of the extraordinary program was devoted to projects addressing problems in suburbs 'characterized by economic and social marginalization (Secchi, 2013), building degradation and shortage of services' (Petranzan, Neri & Purini, 2005).

The program found its cultural reasons in the concept proposed by senator Renzo Piano about 'urban mending', which undoubtedly goes beyond the theme of rebuilding urban fabrics, by including socioeconomic issues related to urban degradation. The "mending" notion proposed by Renzo Piano also recalls the strategy of urban infill (Iacovantuono & Marcoaldi, 2017) , i.e. densification of urban areas (Bettencourt & West, 2011) through the reuse of existing buildings, the construction of new buildings in empty lots, the creation of green areas and urban parks as green networking systems, the development of public services.

The theme of urban regeneration (de Franciscis, 1997) includes different issues related to the pedestrian use of public spaces (Musco, 2009), livability and urban vitality (Clemente, 2017). New projects for contemporary cities often include new constructions on greenfields, more rarely working to develop interstices of the urban fabric, with zero-scale interventions (Aymonino & Mosco, 2006), based essentially on projects of green areas and green infrastructures. Contemporary cities, after taking full advantage of the urban areas and consumed soil, are rewriting a new pact between architecture and nature, building natural landscapes and green infrastructure, called to mend the tears of the urban fabric, to rebalance ecological and environmental instability (Botzat & al., 2016), to regenerate neighbourhoods bogged down by spontaneous urbanization (Bryant, 2006), to define public spaces and places of life (Chon & al., 2009).

Green Infrastructure (GI), often supported by public funding (Regional, National or European), represent an opportunity for urban regeneration (Moffat & al., 2010). Projects born to rebalance urban metabolism, have shaped structural urban features in contemporary cities, sometimes with a great iconic and representative value. Examples are the New York highway, which has become a famous place frequented by residents and tourists; the system of parks and public spaces along the Madrid Rio, the Rose Fitzgerald Kennedy Greenway of Boston, the Buffalo Bayou Promenade. Planning and building urban gardens within inner cities, according to a reverse process that starts from the bottom, or by involvement of citizens in small local interventions, contributes to the creation of a green network that goes to graft and overlap to the primary network of green infrastructures. These projects have also fostered new social practices and new uses of urban open spaces.

When referring to GI within cities, zero-scale urban redevelopment interventions are essentially based on public investments (Ahern, 1995), contrary to what happened in the construction of modern and contemporary cities, which are primarily developed grounding on private investments to buildable land. With economic crisis negatively impacting local finance, agents have been increasingly required to look at the opportunities offered by European programs. Other possible sources of funding are represented by national or regional calls, which provide resources for local authorities to carry out interventions of urban regeneration.

In this paper, the proposal of the Municipality of Perugia to the “Extraordinary program of requalification of urban periphery” will be presented. The proposal, entering in a shortlist of financeable projects with a request of 16,388,790.60 euros, is foreseen to start in the next months. The proposal is a representative example of multi-target intervention incorporating and trying to solve a series of critical issues, typical of

urban suburbs, even if it addresses the requalification a central area of the city. In this regard, the proposal is grounded on the multifunctional value of GI and Urban Gardens as a strategy for peri-urban regeneration. By recovering public spaces with social purpose and providing a comprehensive strategy for aesthetic improvement of the city, Perugia case study provides evidence how greening the city may promote together biodiversity conservation and urban regeneration.

2. URBAN REGENERATION PROJECT FOR FONTIVEGGE DISTRICT, PERUGIA

The project elaborated for the metropolitan area of Perugia was drawn up by the Department of Civil and Environmental Engineering of Perugia University and the Municipality of Perugia and refers to the functional reconnection of the two districts of Fontivegge and Bellocchio separated by railways, and the downstream area of the Perugia train station with the rest of the city.

The project area is a central area of Perugia (the directional center and the Piazza del Bacio designed by Aldo Rossi), where, because of to the presence of the railway station, a progressive social disadvantage has been observed in recent times.

What is striking about this area is that the square designed by the famous architect of Italian rationalism, on which the Umbria Region palace stands, has become a place rarely visited by pedestrians, especially at night, and where the absence of attractive activities open to the public, favors phenomena of social degradation. The project is aimed at creating a public space to promote urban vitality of the entire district (Gehl, 2010), becoming an attractor for young people - which is considered a key factor to ensure urban security (Jacobs, 1961). Urban redesign proposed in the abovementioned project aims at promoting pedestrian accessibility, with a square that gradually descends towards the entrance of the underpass, placing pedestrian and cycle flows at the centre of the scene.

The proposal considers Piazza del Bacio and the large driveway in front of the station, which has the configuration of a large road junction, in an wider vision, that functionally relates the green area behind the upstream square and the district "Bellocchio" on the other side of the railway.

In details, the proposal consists of a series of strictly integrated and easily implemented punctual interventions to improve quality of public buildings (including a library, a new neighborhood center, and the progressive redevelopment of green spaces functioning as a link between the surrounding places), and a series of "widespread" interventions (video surveillance, public lighting, in addition to those of a social nature mainly intended for young people), aimed at improving the level of living in the area. Particularly, it is planned to replace a building currently hosting a commercial centre with a large gym building, and to build a skate park in the opposite area overlooking the square.

The most interesting aspect of the proposal is the theme of the "green infrastructure", which re-incorporate the neighboring green areas, with public spaces in front of the railway area and the natural areas beyond it. In addition to this green infrastructure, a large area dedicated to Urban Gardens has been planned. Developing this area, could give Perugia a primacy among Italian cities due to the high number of gardens (more than 400) and the central position in the city.

The intervention in the ecological parks gives more value to the area, promoting a coordinated process of improvement of user services and spaces. The main operational activities increase the existing vegetation, especially with the use of crops, and involve the construction of urban gardens for local communities with the aim to stimulate place re-appropriation and social wellbeing. Valorization of soft mobility will be implemented through the tarmac repainting of all the areas that are all divided and yet connected in a network model functional for the discover.

A specific color dominates the interventions of redevelopment, materializing in the printed tarmac according to specific surveys carried out with the support of construction/architectural engineering students.



Fig. 1 View of the area project of Fontivegge District in Perugia

Paths will be enriched with naturalness chromatism to create a fundamental "edible landscape" and strengthen connective value of the ecological redesign. In this regard, the project encourages spontaneous naturalization processes, redefining relationships between vegetation and local communities. The pedestrian network now becomes functional to the green infrastructure system and the polarity of the parks, which at the same time are organically functional to the system for pedestrian and bicycle paths that unfold inside them.

The Green Infrastructure Project is treated as a multifunctional strategy (European Commission, 2012) that combines the idea of increasing habitat and connectivity to native flora and fauna, as well as cyclo-pedonal fruition of the area (Brown & al., 2005). The design of urban gardens has also been dealt with an innovative way of "Biodiverse" gardens, where human disturbance does not eradicate native wild species from the garden, but tries to manage the process of functional terms of ecosystem biodiversity. In particular, buffer zones with spontaneous herbaceous species and hedges (always native species, typical of native claddings) are planned, as well as the use of horticultural and officinal species for increasing pollinating insects. Such infrastructures, in their flowering and fruiting cycle, can take on an appealing centrality for the colors, flavors and smells that characterize them.

The project's hypothesis is that through the upgrade of green infrastructure if possible to recovery man-made spaces, bringing citizens at the centre of the interventions (European Environmental Agency, 2011).

3. DISCUSSION

The proposal developed for the area of Fontivegge in Perugia is essentially based on a project of public space and a green infrastructure, with the function of urban reconnection, including a large area destined to urban gardens. These interventions will reinforce the pedestrian flows towards the Piazza del Bacio and towards Piazza Vittorio Veneto in front of the station, creating a vibrant urban environment that can be experienced at all hours of the day.

The abovementioned strategy, that can be appealed to a "pervasion of the Green", aims to promote a re-appropriating of urban places stimulating identity. Identity-making become compliant characteristics to achieve innovative management solutions based on participatory planning, public engagement and social cohesion, in order to ensure long-term sustainability of interventions (Farina, 2000).

The project for the area of Fontivegge leads to more general reflections on the role of green infrastructures and urban gardens to regenerate urban space, opening up new possibilities for the recovery of urban suburbs. The following sections debates on the latent relationship between both interventions and urban regeneration.

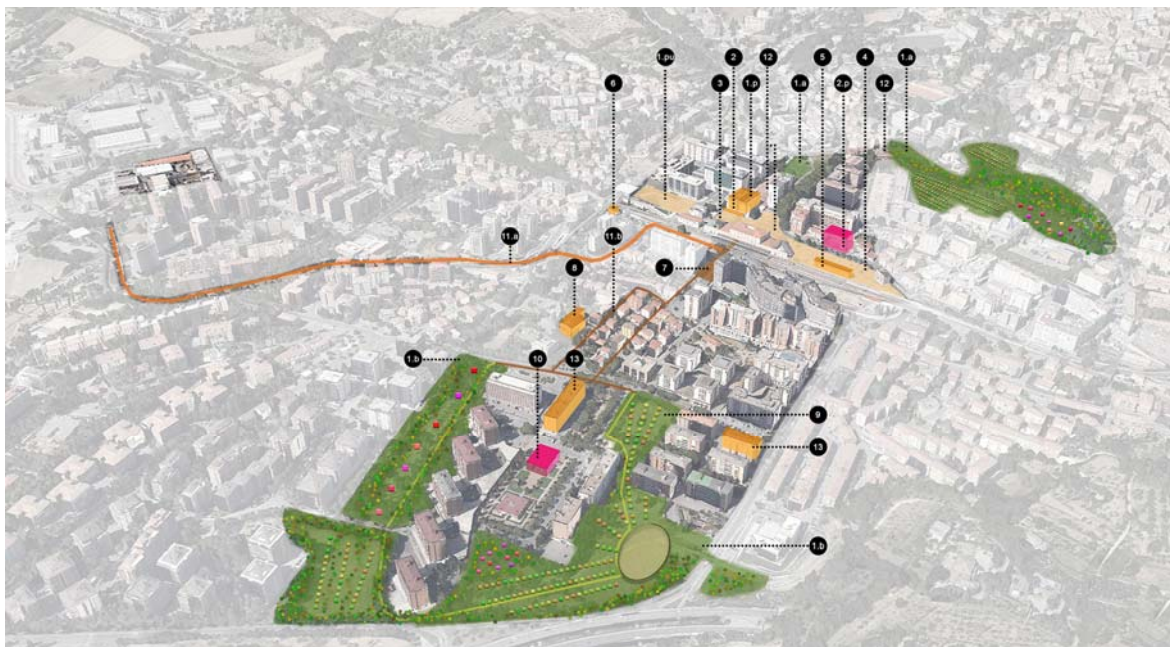


Fig. 2 Masterplan of the whole area, including Belloccchio District and Piazza del Bacio disconnected by the railway station. The drawing highlights the public spaces and the green strategy.

3.1. THE RULE OF GREEN INFRASTRUCTURE IN THE CONTEMPORARY CITY

Green Infrastructure is defined as an ecosystem or a network of ecosystems with specific parts, needs, functions and services, “an interconnected network of green space that conserves natural ecosystem values and functions and provides associated benefits to human populations” (Benedict & al., 2002).

Aspects related to ecological functionality and landscape connectivity play a role in ensuring the normal functioning of ecosystems, and this is essential for providing ecosystem services such as food air quality, carbon sequestration, flood management, water treatment, local climate conditions (Inostroza L., 2014), and soil erosion prevention (European Commission, 2010; Whitford & al., 2001). The European Union has issued directives supported by documents aimed at developing Green Infrastructures in Europe within the overall EU 2020 Biodiversity Strategy to achieve requalification of degraded ecosystems by 2020. Taken together, the main objectives of a GI include (i) promotion of ecosystem health and resilience, (ii) biodiversity conservation and maintenance of ecosystem services (Naumann & al., 2011) (iii) improvement of life quality (La Rocca, 2011), based on the multifunctional use of natural capital (European Commission, 2012).

The EU Working Group on GI strategy has proposed that GI also promotes integrated spatial planning identifying multi-functional zones and incorporating habitat restoration measures into land-use plans and policies (GI Working Group Task 1 Recommendations, 2011). Ultimately, GI contributes to a more sustainable economy based on healthy ecosystems delivering multiple benefits and functions.

At the local scale, GI may benefit from small green patches in urban and peri-urban areas, improving landscape connection. Urban greening include practices of urban forestry, agriculture, farming and gardening, together with the recovery of abandoned urban spaces and peri-urban voids.

Green infrastructure plays a significant action to mitigate the effects of climate change in the urban environment, promoting adaptation strategies of cities (Salata & Yiannakou, 2016). They can play an

important role for the reduction of emissions, prevention of hydro-geological collapse, soil protection, improvement of air quality and conservation of genetic resources potentially better suited to cope with extreme weather and socioeconomic conditions. The resilience to hostile climatic conditions, in fact, is closely linked to the level of biodiversity, and the preservation of traditional varieties.

As the Perugia project clearly suggests, an important role that green infrastructures play in the urban arena is supporting human activities in public spaces. Mitigation of climate change, biodiversity and environmental re-qualification provide justify the relevance of green infrastructures shaping new urban functions and new opportunities for enjoying public space in contact with nature. In their multifunctional dimension, new pedestrian pathways become attractive for private investors, local stakeholders, who can engage in the same recreational and commercial activities that contribute to making the urban environment vital and attractive.



Fig. 3 View of the park "Vittime della Foibe"

A combined action of top-level governance and active community participation, becomes a strategy for retrieving abandoned areas, refurbishing neighborhoods and revitalizing parts of degraded cities, involving planning authorities and policy makers with responsibilities ranging from the local to the European level (Bassoli & al., 2011).

The Green Infrastructure project assumes the value of urban regeneration (Giovinazzi & Giovinazzi, 2010), or a strategy for improving the quality of life of citizens in terms of "smart city". The bottom-up action of Urban Gardens project moves towards the same goal. They fit into urban voids or in public green areas without maintenance, becoming a strategy for retraining degraded or abandoned urban areas, improving the quality of life of local communities, in terms of "resilient city".

3.2. THE SOCIAL DIMENSION OF URBAN GARDENS

Urban gardens can be understood as tools to stimulate the persistence of citizens in the urban context, to support sociality and participation, to promote opportunities for meeting, cohesion (European Environmental Agency, 2011), and for the creation of informal exchange and help networks.



Fig. 4 View of the park including the urban gardens

Recovered urban voids converted into green areas can become real social spaces where they can meet people from different social and age groups. For aging people, they constitute an opportunity of aggregation and participation: they exchange ideas and opinions, rediscovering new forms of sociality and relationship among citizens (Kim & Kaplan, 2004).

There is also an increase in the number of gardens for educational activities into the schools, the vegetable gardens in prisons (for reintegration into the workplace of the prisoners); gardens with a rehabilitation function such as those for orthotherapy, gardening and horticulture activities to support rehabilitation programs for people with disabilities. The therapeutic function of horticulture correlates with the theory of taking care of a living organism as a plant, improves self-esteem and helps the patient regain an active role in society and promotes reintegration into a group.

In this regard, the Perugia project indicates how urban gardens may represent a great opportunity for Municipal Administrations to recover abandoned and degraded areas, making them ordered and productive, and fostering public participation in the activity of local government (Mabellis & Maksymiuk, 2009).

Implementing Urban Gardens has a positive effect on the state of local biodiversity, encouraging changes in social behaviour, toward more awareness to the central role of land management practices reducing/absorbing emissions through a network of urban green spaces.

Realizing vegetable social gardens in urban areas finally strengthens the sense of community and re-occupation of the site, strengthens ties through actions voluntarily supported by society and contributes to counteract exclusion and social isolation (Magnaghi, 2009).

By linking territories to local communities, environmental awareness of citizens may increase, preserving "common goods" through self-management processes of public spaces, to fulfill the increasing social demand for "landscape" (Recanatesi & al., 2016), contributing to sustainable urban form (Pili et al., 2017) and determining an overall aesthetic improvement of green cities and suburbs (Colantoni & al., 2015).



Fig. 5 Masterplan and view of "Parco della Pescaia"

4. CONCLUSIONS

Green infrastructure and Urban Gardens have been conceived in multi-level and innovative ways by new tools made available to administrators and citizens.

The Perugia project demonstrates that (re)designing green spaces and green infrastructure as a support system for human activities can revitalize public spaces, encouraging their use by citizens.

The project foresees to develop, test and verify a systemic approach connecting urban green spaces through a network of Biodiverse Urban Gardens suited to preserve biodiversity and native crops in urban environments. The proposal will act with a bottom-up approach with actions dedicated to the relationship between urban gardens and citizenships, considering different functions in an integrated way: the ecological function, the bio-ecological connection, the social dimension and the urban regeneration strategy.

Urban gardens finally represent an interesting model of collaboration between public and private spheres. Compared to the traditional notion of Green Infrastructure, which should be planned from above and implemented through public funding, urban gardens form a biodiversity network and have the same social effects through micro-interventions by involving citizens in the management and maintenance of green spaces, possibly saving public resources.

The design experiences analyzed here clearly outline the intimate differences between Green Infrastructure and Urban Gardens; in the first case, large-scale unit projects are foreseen, with major investments by public administrations; in the second case, small local projects can be realized with the involvement of small, networked communities, with restricted public investments. Green infrastructure units consider the city in terms of "smart city", while the most widespread and interstitial interventions of Urban Gardens seem to be a "resilient strategy", with even more significant social implications.

Using a strategy in line with the European Biodiversity Guidelines can implement and activate urban regeneration processes and enhancing local territories at the same time.

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