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CHROMATIC CITY

Applying s-RGB Design to contemporary space

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INTRODUCTION:
THE 'NEW URBAN QUESTION'

I. INTRODUCTION: THE 'NEW URBAN QUESTION'

Keywords: *safety, environmental crisis, urban degradation, climate change, social inequality, accessibility*

1.1. Contemporary city crisis and the 'New Urban Question'

The growth of urbanisation and the development of cities over the past two centuries have gradually changed the physical and socio-economic landscape as well as the interrelationships existing between its natural, rural and urban aspects. During the twentieth century this urbanisation process, as a result of an expansive economic model, has accelerated its course due to the technological achievements that allowed companies to transform the landscape and the territory decisively with robust and globalised methods (Sassen, 2004). Railway and road infrastructures, together with the diffusion of settlements, have spread out over a given territory, fragmenting it and often designating natural and/or rural islands as unable to support themselves, producing a progressive construction of the metropolitan archipelago (Indovina, 2008).

In the second half of the last century, particularly in the 1970s, the economic-productive model began to end its cycle, entering the 'third industrial revolution' and the new economy (Rifkin, 2001, 2011), characterised by digitalisation and the growth of the knowledge economy. Industrial change and plant relocation, caused by modifications in the production model, have contributed to the formation of brownfield sites, totally or partially devoid of any useful function. Moreover, in recent decades, the phenomenon of settlement dispersion (sprawl), predominantly residential in form, has taken shape in small compact suburban aggregations or along the main routes of road transport (branched city), contributing to the fragmentation of rural territory, and has also occurred in the peri-urban areas of large cities.

A mosaic of unused open spaces, made up of industrial areas, port and railway areas, military areas, uncultivated areas, residual agricultural plots, abandoned quarries, landfills, degraded and illegal

Fig. 1: Bernardo Secchi, *La città dei ricchi e la città dei poveri*, 2013. In this book, Secchi introduced the 'New Urban Question'.

neighbourhoods, areas awaiting new buildings, all constitute the 'urban voids', or more adequately defined as the 'waste spaces' of contemporaneity (Berger, 2007).

The issue of waste from the contemporary city should not be interpreted only in physical, and consequently environmental terms, for the spread of abandoned and polluted areas that have to be re-functionalised and reclaimed within a new connective tissue of open spaces: this theme also has a social implication that requires particular attention in the distribution of new social topographies and in accentuating the distances between the city of the rich and the city of the poor (Secchi, 2013).

Bauman, in 'Wasted Lives' (Bauman, 2005), applies the concept of waste to human beings because it is the capitalist-consumerist system itself that produces not only an enormous quantity of objects to be thrown quickly into landfill but also numerous abandoned areas and human beings deemed useless to the productive cycle, increasing the number of excluded, ghettoised and economically and psychologically depressed citizens.

The difficulty of rich countries in managing these structural problems is fuelling the fear of crime and social difference, obscuring the real reasons for the problem, catalysing individual anxieties and building a rhetoric of 'urban security' (Secchi, 2013).

This trend is also demonstrated by the growing interest for the safe city in urban planning and design, from at least the late 1960s, especially in the USA: the research was looking for tools and actions capable of preventing crime and social deviance (Jacobs, 1961; Jeffrey, 1971; Newman, 1972; Cornish & Clarke, 1987; Coleman, 1985; Branthingam et al., 2005).

Urban planning research as a crime prevention policy highlighted the responsibility of urban design in determining and aggravating social inequalities in the contemporary city. As Secchi maintains, the responsibilities are not especially linked with the values and the objectives of the modern city project, but they are more significantly connected with the urban design techniques and methodologies that were used in the past and that are still used in the present. The inequalities, which are expressed spatially in a new distribution of

social groups on the territory, in particular in urban areas, find an alignment with the physical geography of the physical and social waste because the latter accept some secondary functions exercised by marginal groups (Acierno, 2003, 2012).

Therefore, among the founding elements of the 'new urban question'[1] (Secchi, 2013), we can find the increase in inequalities and the consequent negative tendency of the richest classes to drive away and segregate the poor: urban planning must define new devices and technical tools in order not to aggravate the situation, as has been done in the past, but to make it better. In the last decades of the past century a growing gap began to emerge between the richest and the poorest with the intensification of social polarisation. The issue is not just related to macroscopic phenomena such as the South American *favelas*, the South African *townships*, the European and North American slums on one hand (the poor), and the *gated communities* or the *barrios cerrados*, on the other (the rich); it is also a consequence of numerous forms of bunkering and segregation of the contemporary city's interstitial spaces and this situation fuels urban fears. In essence, '… social injustices are increasingly revealed in the form of spatial injustices' and show how in all eras when there are socio-economic structural changes, as occurred in the first phase of the industrial era two centuries ago, the urban question re-emerges, defining new social arrangements that are differently distributed on the territory.

1 Secchi identifies three main elements of the 'new urban question': social inequality, climate change and accessibility, the latter in its broad meaning of citizenship law. The project of the city of the future must cope with these issues for a more inclusive and sustainable city.

Fig. 2: The *Vele di Scampia*, residential complex in the Neapolitan suburbs that suffers from social, functional and safety issues (source: https://www.nanopress.it/).

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The contemporary city is made up of closed, introverted and rigid *enclaves* that enhance fragmentation with the attendant risk of erasing public space. Consequently, the interstitial space between the 'fences' becomes the territory of the waste where social and environmental degradation are lurking. The urban voids then become the spaces of real and perceived insecurity, the public space of connective tissue and social integration is converted into a space of exclusion.

1.2 The in-between city

With regard to the urban crisis, in the international urbanistic debate the term 'in-between city' often refers to the ideas of a widespread city, city-region or intermediate city in line with the affirmation in Europe of the *Zwischenstadt* concept at the end of the twentieth century and the beginning of the twenty-first century (Sieverts, 2003).

This German term does not have a direct equivalent in other languages as it describes a contemporary functional and economic urban condition and explains that the city of today is currently in an intermediate and precarious situation between place and world, space and time, city and country. The translation of the term into English has never completely expressed the new concept of a contemporary city, so the international research usually recalls other terms such as intermediate city or meta-city.

This concept is linked with the themes of the disintegration of the boundaries between city and countryside, the urban fabric's interpenetration in the rural and natural space, and the gradual disappearance of the settlement patterns' traditional hierarchy. It deals with the dissolution of the compact European city and with the formation of a new shape of city, often referred to as an *urbanised landscape* or *landscape city*: this urban typology lies between the compact city and the one spread in the countryside, between well-defined places of lived space and undefined spaces (non-places) of the movement between the territorially defined cycles of local economies and the imperceptible ones of the globalised market (Sieverts, 2003).

Sieverts reasons about the incipient form of the contemporary city which unfortunately cannot preserve the compactness of the traditional city, nor the bucolic dimension of rural villages nor the beauty of the natural landscape: it will have a specific structure that urban planning will have to learn to control and manage.

Actually, this reflection on the structure of the industrial city, which is distributed over the territory by establishing a new dialogue with the open spaces and the countryside, is not entirely new but must be placed within a line of studies, which has been already discussed thoroughly in the past and which has always reasoned about dissolution of cities and new models that could derive from it.

The first studies can be traced back to Ebenezer Howard's Garden City: in 1898, Howard conceived a response to the excessive density of the industrial city that resulted in degradation, pollution, disease and malaise for the communities, and he hypothesised a new model of integration between buildings and open spaces with reduced density and more availability of green areas that can provide hygiene, health, recreation and economic benefits. This urban model proposal had its first applications in the first decades of the last century and subsequently became the main inspiration for the urban policy

Fig. 3: Urban structural models by Sieverts (source: A. Borsdorf, *Zwischenstadt - Stadtland oder nur noch Stadt? Zur Entwicklung im Stadt-Land-Verbund*, 2009).

Bandstadt   Gartenstadt / Satellitenstadt   Zentrale Orte   Produktionsraum Stadt

Stadt als Markt   Bodenpreismodell   Fingerstadt   Stadtregion

zerstreute Stadt   fraktale Stadt   Weltstadt
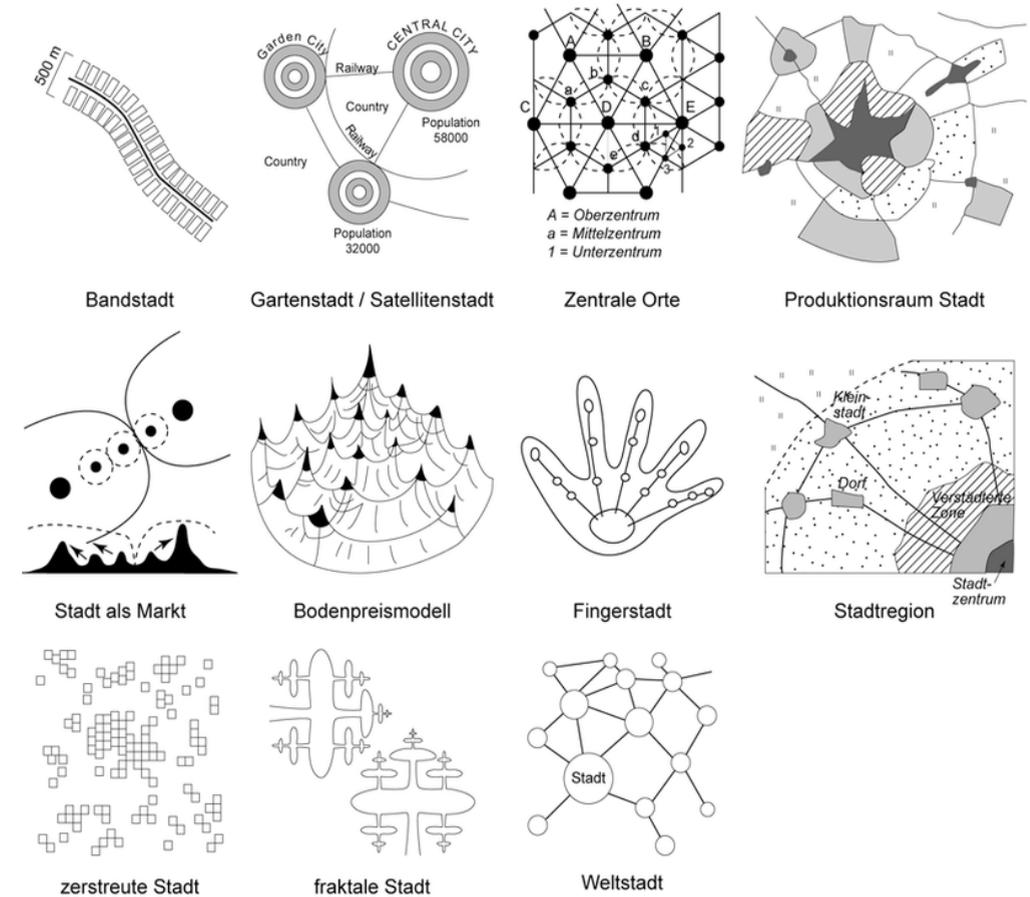
implemented by the British government in 1947 with the construction of the first and second generations of *New Towns*, which characterised the controlled expansion of English cities until the 1960s.

As early as 1915, Geddes spoke about 'conurbation' referring to the new shape of the industrial city, looking to the example of the territory of Randstad in the Netherlands and trying to describe that kind of landscape composed by the chain-linked urban centres' continuity. Later, in 1961, J. Gottmann coined the term 'megalopolis' in an attempt to define the new 'urban nebula' that stretched between Boston and Philadelphia. In those years, people began to talk about the edge-city, sprawl, territory-city, landscape-city, showing the definition of a new urban form capable of subverting the consolidated conception of cities.

In the first decades of the 1900s, the debate between modern architecture and urban planning deals with the relationship between cities and green spaces, focusing on the distribution of new residential districts: from the CIAM congresses to the *siedlungen* experimentations, up to the '*ville verte*' proposals by Le Corbusier. The major exponents of the Modern Movement debate on the new model of city and, among them, Le Corbusier is certainly the one who expresses more than any other in his urban conceptions the need for a redefinition of the relationship between man and nature by distribu-

Fig. 4: On the left: T. Sieverts, Zwischenstadt, 1997; on the right: urban archipelago, imagined by Sieverts (source: A. Borsdorf, Zwischenstadt - Stadtland oder nur noch Stadt? Zur Entwicklung im Stadt-Land-Verbund, 2009).
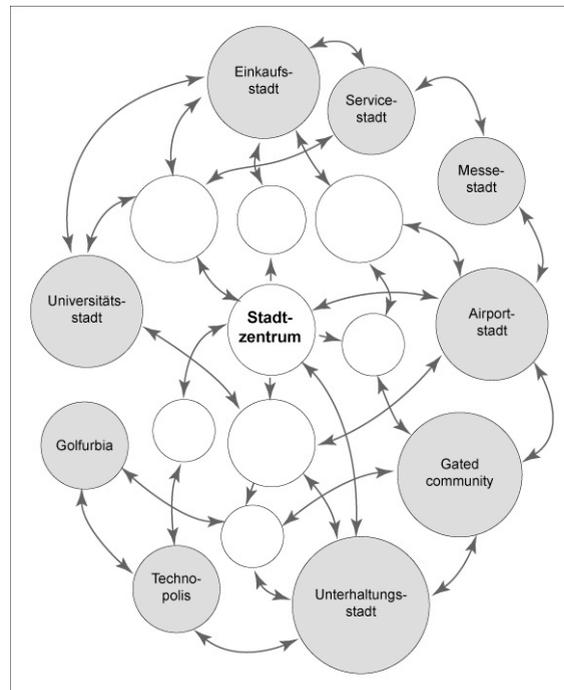
ting buildings, in his urban scale projects, on a vast green carpet that occupies almost 90% of the surface, with a clear separation of car and pedestrian traffic, distributing the latter between the urban and residential parks and, finally, bringing the green also onto the roofs. The Modern Movement is aimed at solving the problems of congestion and overcrowding in the historic city and the issue of the first peripheral working-class neighbourhoods, characterised by very low housing standards and, therefore, introduces renewed settlement patterns considering the presence of vast green areas.

As a result, the document *Towards an Urban Renaissance*, drafted in 1999 of by Richard Rogers, head of the Urban Task Force, the most recent European urban planning debate, developed in the United Kingdom, deals with the issue of the dispersed city (as Rogers defines the current city) and provides some principles for city planning in respect of green spaces, urban quality through the regeneration of abandoned and underused urban tissue. It proposes the 'renaissance of the cities' favouring greater densities in the urban centre, an efficient transport network and sustainable communities.

Sieverts declares that, in order to look at a new urban model for the future, it must be recognised that the natural world has been penetrated almost everywhere by human artifacts and, therefore, there is no longer a boundary between city and nature. The model of the European compact city, which is still trying to defend itself, could be ineffective and even provide the alibi for new investors and speculators following other objectives.

The recovery and re-use of urban voids, both concentrated and diffuse interstitial ones, become means for the reconstruction of green tissues for environmental remediation and risk defence, but also for the reconstruction of sociality.

1.3 Urban Resilience

The *brownfields*, more than other areas of the city, have constituted a basis for reflection and criticism of the evils of the contemporary city but at the same time they have offered themselves to the urban narrative (Secchi, 1984) for their energetic potential for prefiguring a new structure of an urban order capable of converting the 'evils' of the city into 'good': new infrastructural systems, conversion into a functional mix, experimentation with the ecological city and reconstruction of a coherent system of public spaces.

Today many of those voids have not yet been filled (Bagnoli in Na-

Fig. 5: Brownfield in eastern Naples (source: Google Maps).

Fig. 6: Alain Berger, *Drosscape*, 2007.

transport infrastructures that must become less impactful with the use of green technologies, to which are added, above all, new energy infrastructures from renewable sources, systems of water drainage, reclamation systems for polluted sites, organic agricultural production systems and new, sustainable districts (Gasparrini, 2015; Pavia et al., 2014).

In relation to the need for a different and more effective planning attitude, the metaphor of resilience cannot be overlooked; it became part of urban and territorial planning at the end of the last
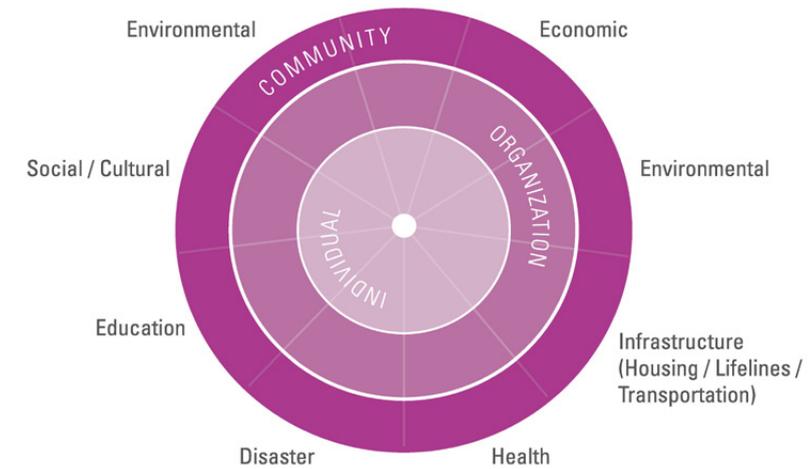
Fig. 7: The resilience wheel (source: UNISDR).

ples is a case in point) and the theme of 'urban waste' has become so pervasive that it can no longer be confined within the industrial production cycle and the consequent recovery of brownfield but rather, it involves a new interpretation of the urban landscape as *drosscape* (Berger, 2007).

With this term we want to look, with a positive design attitude, to the consumption of land and urbanisation waste (dross) for which there is the possibility to solve the problem through reuse and recycling (Berger, 2006). The interpretation of the contemporary landscape proposed by Alan Berger is based on a vision of urbanised areas as waste products of the past industrial economy. Waste landscape must be accepted as an inevitable side effect of industrial processes and, therefore, it is necessary to design it in such a way as to incorporate and metabolise waste within the urban process.

It is inevitable to deduce that the recovery and recycling of abandoned sites or more generally urban voids are not just a of physical requalification of building volumes with attribution of new functions, which in itself would not solve the problem of the constant production of waste in the current process of urbanisation. Instead, it is necessary to have a design attitude that looks at the landscape as an integrated system of sustainable and resilient infrastructures: traditional

century, thanks to the sustainable city studies.

The etymological meaning of the word has to be traced in the Latin term *resilire* which defines resilience as 'jumping back, bouncing' and indicates the ability of a system or material to recover an equilibrium condition after a shock or effort. It derives from the engineering science of the nineteenth century, but, in this case, it does not consider the dynamism of the socio-economic and spatial processes and the capacities of transformation that usually lead to new conditions of equilibrium rather than to maintaining original conditions.

Subsequently, the concept of resilience has been introduced in ecological studies where it takes on a slightly different meaning: it is in fact considered as the transition process that brings an ecosystem, subjected to external changes, to resolve into a new equilibrium structure, highlighting the capacity of the natural environment in regenerating and reaching the condition of a new state (Low et al., 2003; Walker and Salt, 2006).

Similarly, this principle has also been transposed to the communities, in trying to identify the possibilities for a social response to
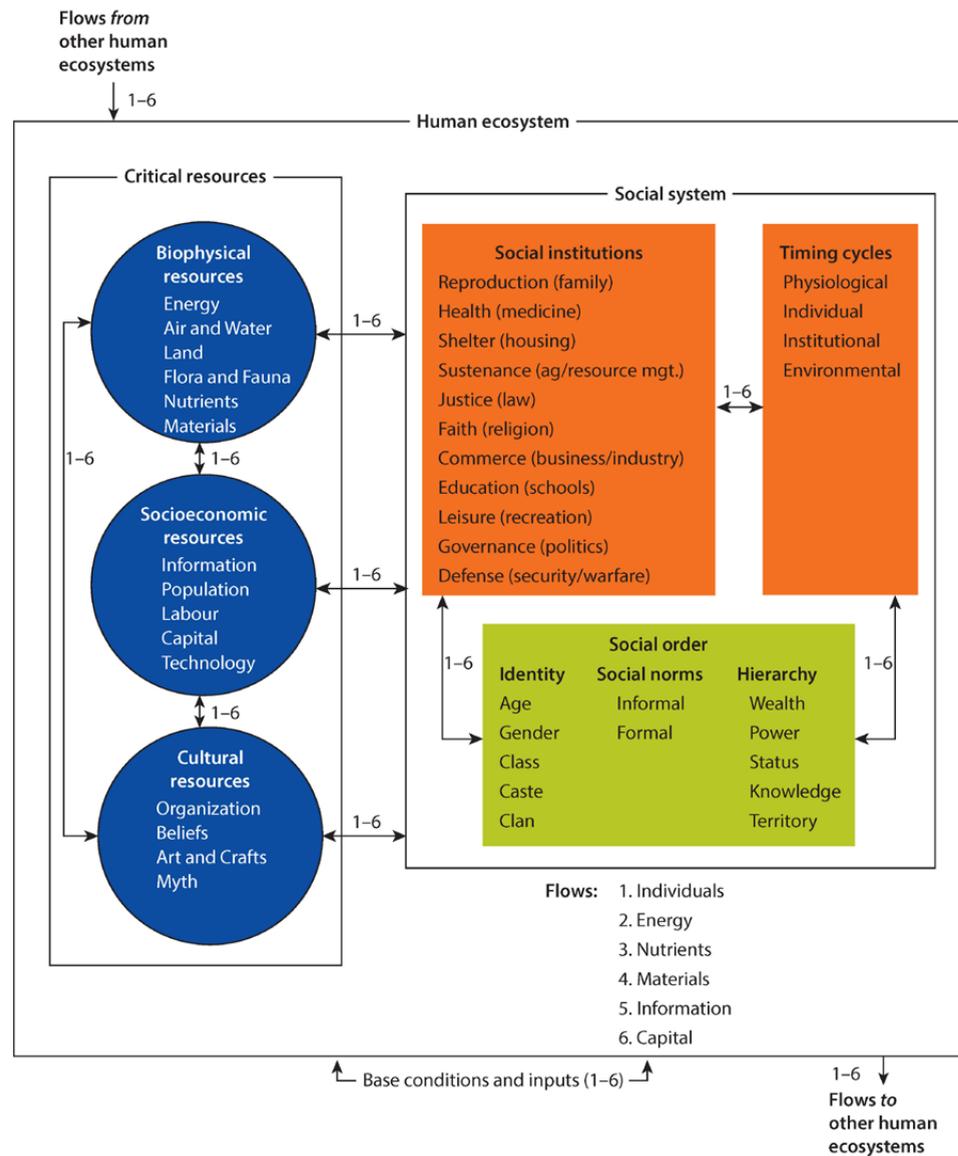
Fig. 8: The human ecosystem (source: Jha A.K., Building Urban Resilience. Priciples, Tools, and practice, World Bank).

demographic, economic and employment changes.

Resilience comes later in the field of urban and territorial planning and is based on its existing definitions in different research fields, however, the most consistent approach to the discipline is certainly the ecological one that looks at the 'city system' as an organism in continuous transformation that organises itself according to stressful natural or socio-economic events in order to reach acceptable levels of efficiency.

According to this ecological definition of urban resilience, it is

interesting to consider the attempt to classify the scientific literature on resilience (Colucci, 2012) that identifies three main groups of texts describing different approaches and strategies. The three thematic strands are related to *resilience and sustainability*, *resilience and adaptation* and, finally, *resilience and territorial risks*.

In the first case, resilience is intended as a tool to pursue the sustainability of development in urban and territorial transformations, in a broad and general sense.

In the second case, the focus is on climate change and the gradual reduction of energy resources required, above all the progressive lack of hydrocarbons with the impending peak oil: to deal with these problems, resilience is conceived of as a virtuous model of urban and territorial development.

In the third case, resilience is predominantly understood as a response strategy by territories and communities to natural disasters.

Actually, these three concepts are not so different from each other and are often interrelated, but they can be useful guiding criteria for dealing with the vast literature on resilience and understanding the point of view of each author.

Resilience becomes a tool to guarantee the long-term sustainability of the urban ecosystem, whose resilience characteristics are the diversity of components and creative redundancy, indispensable for absorbing exogenous shocks and gradually adapting to a new condition constituted from innovative relationships of interdependence (Low, Ostrom, Simon, Wilson, 2003).

The idea of *transition city* is particularly remarkable: it has been coined by Rob Hopkins (2008) and it has become a resilient city model with particular emphasis on the characteristics of diversity, modularity and feedback.[2] The mainly British experiences of transition cities favour the collaboration with the local community and bottom-up processes capable of generating innovation in social behaviour. One of the strengths of transition cities is in fact the ability to imagine the future, elaborating a positive vision in line with social inclusion, activation of local human resources and capacity for self-organisation.

Within the research on resilience and adaptation, in addition to the community-emphasising transition cities, there are also purely urban planning and urban design studies which propose functional models of organisation in which there is a clear distinction between the building environment, on the one hand, and the infrastructural networks (energy, transport, water, natural environment, food cycles, agriculture, waste collection, etc.) on the other (Newman, Beatley, Boyer, 2005). Resilience is pursued through the management

2 In this regard consult the website https://www.transitionnetwork.org/

3 Neighbourhoods such as BedZed in London, Vauban in Freiburg, Kronsberg in Hanover, Solar City in Linz, Bo01 in Malmö are some of the best-known ones.

of the building system and infrastructure systems that respect ecosystem cycles.

To cope with climate change and the progressive reduction of traditional energy resources, the resilient city is required to develop the redundancy of the urban organism, in the likeness of living organisms, elaborating technological solutions for building and urban retrofitting, already tested in many sustainable neighbourhoods in Europe,[3] to ensure better energy performance.

The modularisation of the city's key infrastructures (energy, water, communications, waste) is a fundamental strategy for urban functioning. If a node of one of the networks or a network itself suffers a crisis, this must not constitute a reason for blocking the entire system or part of the city: modular decomposition can guarantee the provision of services. Modularisation and redundancy of infrastructure systems represents a solution, in imitation of ecosystems, to cope with moments of particular stress in the city.

Resilient cities must be based on an 'integrated metabolism' that brings together the various urban functions (energy production, transport, waste management, etc.), making the city a 'living machine' capable of reducing energy consumption.

Italy is a geologically young land and it is affected by seismic and volcanic risk. In recent years it has been experiencing the devastating effects of increasingly frequent floods and it has been affected by climate changes related to the Mediterranean area with a high risk of coastal erosion, where the main urban and metropolitan centres are. The history of humanity has seen the concentration of the main urban settlements precisely in the areas that are most at risk, especially volcanic and coastal zones, because these sites have always been advantageous for the access to water, the development of agricultural activities and transport.

In order to face the challenges and make cities resilient, it is ne-

cessary to identify fields of intervention within which is possible to define suitable measures and methods to achieve the objectives of resilience.
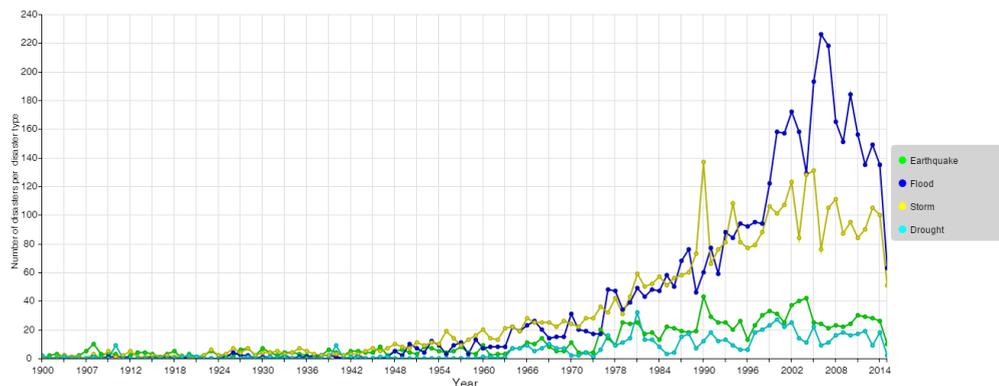
As part of the Italian Agenda 21 coordination, some guidelines[4] were defined in local Action Plans for sustainable energy and climate management. They suggest the goals for the resilient city, including the protection of the urban system from the impacts of climate change, rebuilding a less conflictual relationship between the city's artificiality and its historicised natural context, improving the governance of sustainable urban development and the responsible use of natural resources, thereby strengthening social cohesion.

4 The document 'Resilient cities. The adaptation of urban systems to climate change', from which the guidelines are drawn, can be downloaded from the website http://www. comune.modena.it/ ilclimadellecitta

Fig. 10: The 6 challenges of resilience (source: Applegath C., Future proofing cities, www. resilientcity.org).

In order to pursue the objectives listed above, the areas of intervention should concern the territorial planning linked to the reduction in land consumption and to the development of large-scale urban design; urban planning should also consider territorial vulnerability management in relation to hydrogeological risk through forecasting and preventative actions; it should also consider the development of the management and design of urban settlements, of actions to safeguard and control the water resource, but also to green up the city with the creation of urban green infrastructures; urban planning should address civil protection for emergency management and for the provision of social and health services (Meriläinen, 2019; Croese, Green, Morgan, 2020).

The territorial planning for resilience must conform to the principle of reducing the consumption of land, to the aim of designing green infrastructures in order to mitigate risks and exploit slow mobility and the rural and architectural-cultural heritage and to the ideal of limiting and managing sprawl in favour of compact city models, incorporating the concept of hydraulic invariance of activities and settlements with the adoption of ecological compensation.

To cope with the tangible outcomes of the ongoing climate change, which can be found in the increasing number of floods, it is necessary to carry out routine maintenance of the soil and natural river beds, supported by the construction of sustainable drainage works

Fig. 9: Increase in natural disasters in the world divided into categories (source: www. emdat.be).

(green roofs, filter strips, rain gardens, etc.), together with the organisation of agricultural activities.

The concept of 'antifragility' is a recent conceptualisation in the field of urban planning, which attempts to move beyond the very principle of resilience (Cecchini and Blečić, 2015). This term recovers the one introduced by the mathematician Nassin Nicholas Taleb in 2012 in his volume 'Antifragile. Thrive in disorder'. The concept of antifragility intends to elaborate a positive new meaning with respect to 'robustness' and 'resilience', since the latter ones would be indifferent to time. In fact, when systems are invested with calamities, stress or disturbances, if they are robust, they will be able to resist; if they are resilient, they will be able to return to the initial condition: in both cases there will be no substantial changes compared to the original conditions. The antifragile system, on the other hand, would be able to achieve positive results, essentially gaining from the calamities because it manages to evolve, to improve over time. The city is obviously seen as emblematic of an antifragile system because it is constantly evolving and, therefore, it can, in the medium-long term, overcome disturbances and improve itself. In fact, we do not look at a specific city or a part of it but at the city as an entity that has survived for about six thousand years and that has constantly been renewed, absorbing the natural and social impacts. The main feature that makes the city antifragile is its 'complexity', the articulation of its parts and the redundancy of its relationships and internal networks.

The theory of complexity refers to the concept of the 'complex system', made up of different subsystems and components that are strongly interrelated, for which it is not possible to proceed analytically by separating the elements and problems to solve. A complex system, such as the city, must be investigated by resorting to holistic approaches that attempt to understand the links and relations between the parts and the unitary actions that derive from its unitary mechanism, aware of the number of components and the high degree of articulation in their relations (Bateson, 1977; Morin, 1993).

From this conceptual base, it is possible to develop an 'antifragile planning', that is a design typology aspiring to avail itself of territorial planning policies and antifragile decisions in the interest of the city, which in turn will have to acquire characteristics of antifragility. The operational structure of this planning should be articulated on three levels: *shared vision*, *negative path* and *project space*. The *shared vision* defines general ethical goals that society intends to pursue in a given period of time, enhancing the urban rights to the citizens and guaranteeing greater opportunities thanks to the available resources

in a certain period: in summary, the shared vision should amplify the possibilities and potential of each citizen. The pursuit of objectives and a general scenario are based on compliance with certain rules that must act as guides for citizens. This set of rules that clearly prescribes certain things to avoid, because it compromises the common good, represents the 'negative way' of urban planning. The latter not only defines the absolutely forbidden actions (building on the river beds, using inadequate materials, etc.) but also promotes positive ones (considering energy performance, anti-seismic regulations, environmentally friendly design, etc.). The negative way is not only an indication of the good rules of transformation, but also the elimination of all that is superfluous and that weighs down the processes, freeing action from obstacles and administrative constraints.

Finally, the third element relating to the *space of the project* acts within the limits of action established by the other two principles: it gives ample freedom to the design choices, respecting the constraints of the negative path and is coherent with the objectives of the shared vision.

1.4 The International documents on urban crisis: NUA and SDGs

The themes of the crisis of the contemporary city and the new urban question hypothesised by Secchi converge in the issues dealt with by the Habitat III conference, held in Quito in 2016, during which the members of the United Nations Assembly made a significant step forward in defining the New Urban Agenda. This document represents not only a vision for the future but also a serious commitment in pursuing a more sustainable urban reality. Indeed, the New Urban Agenda defines a long-term strategy to tackle emerging problems, such as poverty, climate change, and the quality of urban life, defining a shared collective approach. The basic idea considers urbanisation as a driver for sustainable development, provided that its complex structure is oriented towards positive growth. All the countries involved must work to improve urbanisation through a 'three-legged approach' that includes local tax systems, urban planning as well as basic services and infrastructure.

Fig. 11: United Nations, *New Urban Agenda*, 2016.

The New Urban Agenda also represents a commitment to democratic development of countries and a driver for social improvement while respecting the environment and urbanisation. It affirms issues such as equity, security and resilience, focusing primarily on developing countries and urban areas.

This document recognises that urban trends all over the world are determining more and more metropolises and urban corridors in which the population tends progressively to concentrate. Together with the problems arising from new urban trends, urbanisation is still the solution as the city is the nucleus of national economies.

The intentions of the New Urban Agenda also converge in the implementation of the 2030 Agenda for Sustainable Development and in particular in the *Goal n.11 - Making cities and human settlements inclusive, safe, resilient and sustainable*. The Millennium Goals aim to achieve by 2030 a series of concrete objectives, among which are guaranteeing adequate accessibility to all, along with the expansion of the public transport system, redeveloping the most peripheral degraded areas by promoting a connection between positive rural, peri-urban and urban areas, improving planning and participatory management, supporting the adoption of integrated policies and plans in favour of resilience and protection from risks, while reducing the environmental impact of cities and protecting historical and cultural heritage.

It is, therefore, clear that urban planning must focus on the promotion of an integrated development that ensures a safe and inclusive environment. It is necessary to guarantee the implementation of settlement resilience in order to improve the quality of life and city, developing a planning methodology that is based on the most recent and efficient research results on the subject.

CHAPTER II

R**EGENERATIVE DESIGN**

II. REGENERATIVE DESIGN

Keywords: *regenerative, re-cycle, sustainable, green, regeneration, social integration*

2.1 Systemic approach for a sustainable urban planning

The new urban crisis theorised by Secchi has influenced the cities' and territorial development's perception, directing urban research towards the pursuit of resilient cities to face the conflicts inherent in contemporary settlements. The need to accelerate the adoption of sustainability principles, promoted by the various national and international agendas, is, therefore, evident (New Urban Agenda, Agenda 2030, Agenda 21): the aim is to introduce this criterion into planning processes, integrating it into the project from the earliest stages of conception. For this to be possible, the development must be directed towards a *triple bottom line* model that follows the 3P concept (Elkington, 1994): social equity (*People*) points to the protection of human capital, considering man as the direct beneficiary of the system considered, but also as a principal actor who can shape it and improve it; the environmental aspect (*Planet*) refers to natural capital and minimises the impact on the ecosystem, basing the processes on the ideal of *life cycle assessment*; finally, the economic profit (*Profit*) deducts the costs of the interventions and maximises the economic return.

Fig. 13: The three bottom line of sustainable development (source: Attia S., *Regenerative and Positive Impact Architecture: Learning from Case Studies*, 2018).

People | Planet | Profit

Human | Materials | Diversity | Water | Energy | Daylight | Air | Money
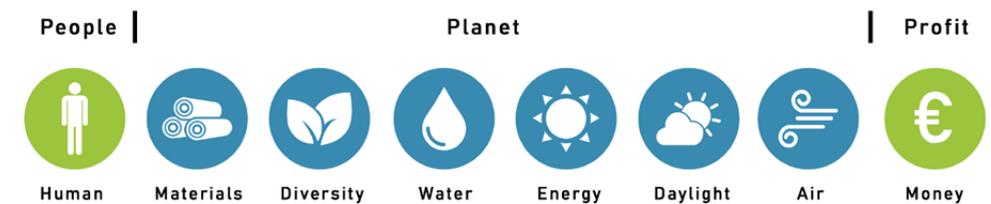
This concept aligns planning with the essence of regenerative design, which is a *process-oriented approach* to systemic design that is

rapidly emerging on international research horizons. The term 're-generative' describes the processes that restore, renew or revitalise the energy sources and materials from which they develop; this approach acts on the entire systemic structure of the city to make it resilient, integrating the needs of society with the integrity of nature.

More specifically, regenerative planning is defined as a system of
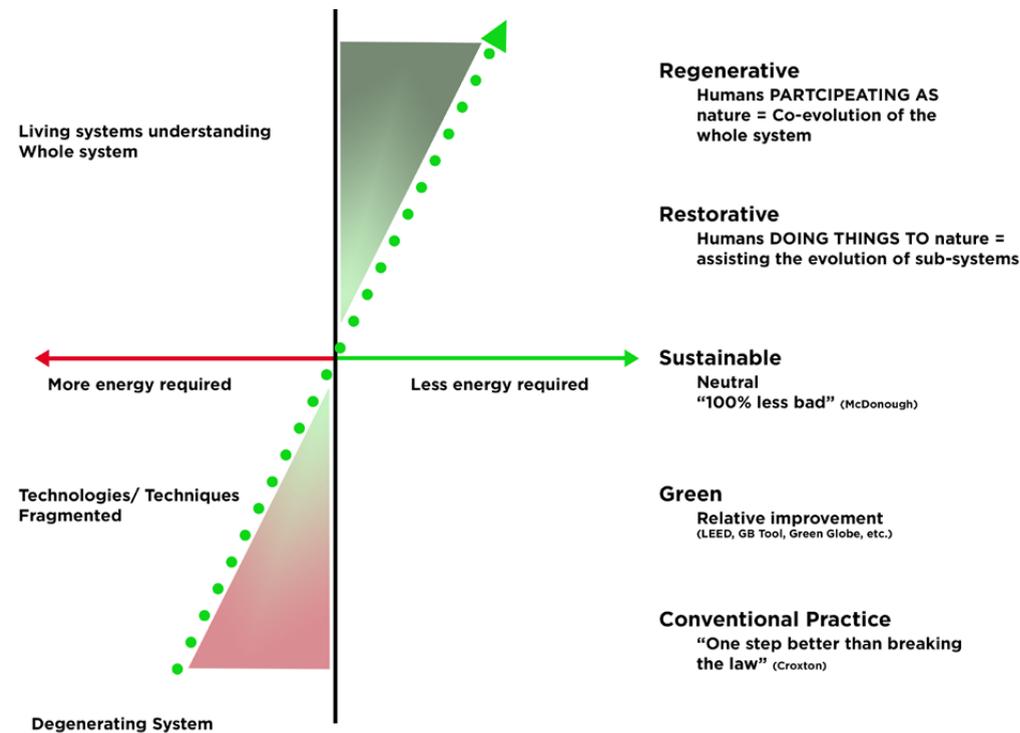
Fig. 14: Trajectory of environmentally responsible design: regenerative approach grants a lesser amount of energy and a systemical methodology (source: Regenesis Group).

actions and strategies based on understanding the intrinsic functioning of ecosystems, with the aim of regenerating the socio-ecological aspects of settlements. The purpose is to provide new positive inputs to urban vitality without exhausting the fundamental support of the resources from which to draw to support their progressive evolution. Regenerative design fits into the category of system-thinking approaches: it highlights the systemic relationships rather than the individual elements, thus identifying the dynamic change directions rather than elaborating a static image of the state of fact; in this way the evolutionary phenomenon of the city as a whole appears more clearly than in a partial and temporally limited way (Mang & Reed, 2019).

A regenerative development aims to improve the abilities of li-

ving beings to co-evolve with the environment in which they find themselves, so that the latter can continue to express its potential in terms of biodiversity, structural complexity and systemic creativity. For this to happen, human activity must harmonise with the life of the planet, and regenerative design aims to provide maximum methodological support to communities over time (Mang & Haggard, 2016).

In fact, as it is now clear that industrialisation and economic growth go hand in hand with environmental degradation, regenerative approaches seek not only to reverse the degenerative process towards which the city in crisis tends to slip while affecting the reference territorial context, but also to define a settlement system that is able to develop in parallel with the natural system, thus generating mutual benefit and expressing the character of resilience. In particular, regenerative design transcends scales both in terms of size, from the size of the building to the ecosystem space, and in terms of time, from the short to the long term; this type of planning is concerned with providing for basic human needs in an equitable manner, utilising diversified and redundant systems that are more resistant because they respond better to interruptions or changes. Systemic flexibility ensures a dynamic future for settlements, thanks also to the use of local and renewable resources: these characteristics ultimately benefit social and community equity.

2.2 Methodological evolution of the regenerative design

Of particular importance for the understanding of regenerative development is the framework devised by Charles Krone in the 1960s and 1970s, according to which there are two different levels of work and a hierarchical relationship between them. The lowest level, in which the operations from scratch and conservation take place, focuses on the category of existence, or what is already physically manifest. At the highest level we focus on the category of potential, that is, what is not yet manifest but whose realisation can lead to an overall systemic advancement. In this sphere, the qualitative improvement, and above all, the regeneration are found; therefore, it is evident that the regenerative approach serves as a methodological guide for the other operational levels.

The ideological roots of the regenerative design can be located at the beginning of the last century; in 1915, Geddes compared settlements to living organisms. As a biologist, he believed that framing the

Fig. 15: Panoramic view of the E.V.A. Lanxmeer green district, built at Culemborg, The Netherlands. It is a recent neighbourood (1994-2009) of approximately 250 ecological houses, several offices and a urban farm. The conception of this district is based on permaculture, and organic design (source: http://www.eva-lanxmeer.nl/).

problem of unsustainable urban development means understanding the context in which the city fits, that is, all the natural features and processes of the landscape as well as the resources available. A methodological advancement was, therefore, necessary to overcome the *paleotechnic* approach, responsible for negative urban growth, in order to point the way to a *neotechnical* approach which would have led to a more sustainable change of course (Geddes, 1915). The research of Geddes will influence the international urban planning theory: in this vein, the research of the Australian ecologist Mollison are located. In 1978, he coined the term *permaculture*, a contraction of permanent agriculture, that is, an ecological design system whose purpose is to promote the positive growth of human habitat and at the same time engender the production processes of natural resources, inspired by the principles of sustainability of rural communities. The goal is the creation of man-made ecosystems through which we can satisfy the needs of the population, reducing dependence on industrial production so damaging to the environment. Mollison, therefore, introduces a hierarchy of possible investments, namely regenerative, generative and degenerative: this hierarchy acts as an evaluation model to establish the potential value of certain design actions and the regenerative capacity of a given system.

Fig. 16: Example of greenhouses in the E.V.A. Lanxmeer district (source: http://www.eva-lanxmeer.nl/).

5 In this regard, it is possible to visit the site https://regenesisgroup.com/

In 1980, Rodale associated the term 'regenerative' with land use, describing the incessant organic renewal of ecosystems as the basis of the mutual relationship between the environment and human resources. Although Rodale's work does not include the built environment, he still influenced Lyle, a landscape architect among the main theorists of regenerative design. Lyle supports the multiscale nature of the ecological approach in urban planning as an essential feature to guarantee lasting benefits and develop responsible strategies. Rodale's work also defines the urban ecosystem as the place where humanity and nature can positively coexist, placing the settlement dimension at the centre of the question. The regenerative design underpins the principle of considering the urban ecosystem in a unitary sense, considering all the relationships that exist between its elements: this concept derives from ecological science, fundamental to reshaping the city as a dynamic organism. Ecological principles are, in fact, related to the mechanics of architecture and urban planning: just as nature wisely shapes ecosystems, in the same way, planners must attribute an efficient form to the city and its buildings (Lyle, 1984).

In 1995, the Regenesis Group[5] was established, founded with the aim of further developing the theoretical contributions of the pioneers of regenerative design, encouraging the co-

Fig. 17: Lyle J. T., *Regenerative Design for Sustainable Development*, 1994.

Regenerative Design for Sustainable Development

John Tillman Lyle

6 *Biophilia* is an approach that considers social relations between human beings as primary: in urban planning, this methodology allows us to deepen the planning by equipping it with features that emphasise the system of complex social interactions, so that the inhabitants can benefit the most, thus increasing the productivity and quality of life in general.

7 The theory defined *biomimicry* or *biomimetics* studies the characteristics of natural elements, models or systems to extrapolate high-performance technical solutions to the benefit of human well-being. For this reason, it is closely connected to the natural sciences which mainly provide notions of ecology and biology to designers.

evolution of society and the territorial context and the regeneration of the city's environmental and cultural values. At the dawn of the new century, this approach still appears as a leading phenomenon in the urban research landscape, following the trend of sustainable urban planning, historically more deeply rooted, and broadening its theoretical and applicative horizons.
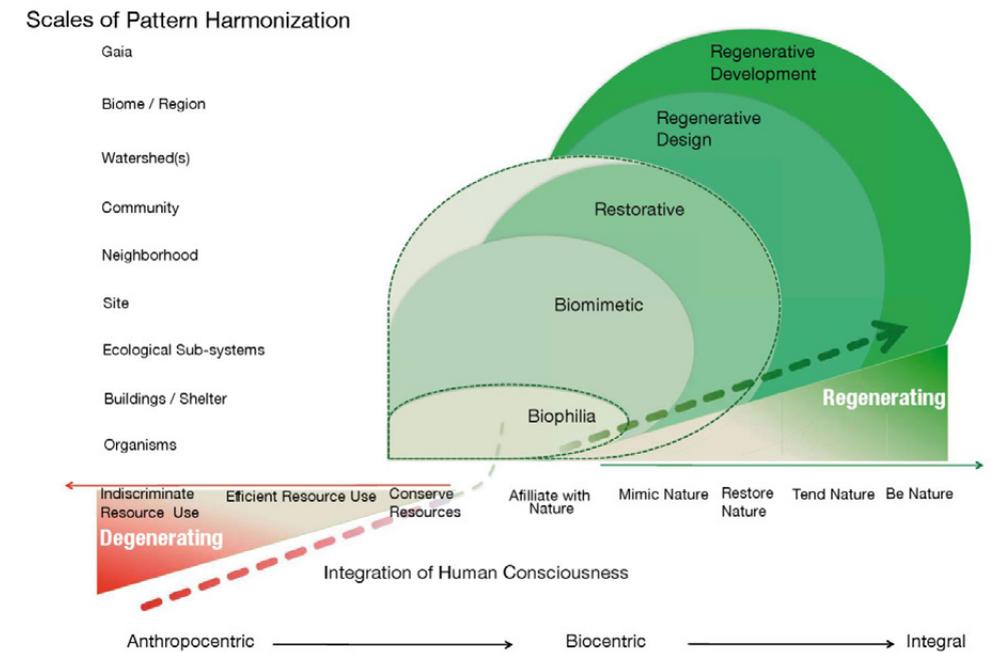
2.3 Advantages for the quality of the city

Despite being a recently formulated approach, regenerative design is, however, the result of long and progressive experimentation, thus incorporating the characteristics of different methodological currents. In accordance with the parameters of green design, planning must reduce harmful impacts on the most sensitive natural areas, limiting the need for new infrastructure and the production of urban waste, while enhancing citizens' well-being and urban-territorial quality (Cole, 2012).

As the theory of sustainable design shows, the project must guarantee the satisfaction of today's needs of the city without affecting the resources necessary for future generations to satisfy their own. The approach to sustainability can be defined in two different ways. Technological sustainability has an anthropocentric nature and is based on technical and engineering advancement to the benefit of systemic efficiency, while ecological sustainability is more bio-centric and aims to preserve natural ecosystem functions: regenerative design is more specifically linked to this latter kind of approach (Orr, 1992). Moreover, the *net-positive theory* redefines the concept of sustainability; the output of the project will, therefore, be quantitatively and qualitatively higher than the resources used to achieve it, guaranteeing a dynamic balance (Mang & Haggard, 2016).

According to the restorative design, the planning methodology must allow the inhabitants to restore the urban ecosystem through development, recognising the environmental damage caused by their activities and fixing it through careful territorial management and responsible social self-organization, aimed at positive manipulation of the city-environment system. Furthermore, bio-inspired design contributes to the regenerative project by deepening the relationship between humanity and the biological and ecological sciences: the aim is to improve human psychological well-being, from a biophilic point of view,[6] and to enhance technologies according to the principles of *biomimicry*.[7] Finally, the contribution of ecological

design can be read in the conception of specific urban planning strategies that improve human health and biodiversity, compatibly with environmental aspects, modulating actions in accordance with the different urban ecosystems (Trombetta, 2018).

Regenerative design is, therefore, extremely articulated: it is focused on adaptive and dynamic strategies that allow a focus on the systemic characteristics of the interventions and on the related processes, during all the built space's design phases.

The theoretical principles of regenerative planning foresee a continuous energy exchange and production of materials: efficiency is guaranteed through functional processes that are strictly connected to each other. In particular, regenerative development aims to cooperate with nature, letting it follow its course to which it adapts without hindering it: the surrounding environment is, in fact, the model on which the regenerative design must be based. The approach exploits the logic of aggregation rather than isolation, aiming at the achievement of optimal socio-environmental welfare standards (Craft, Ding, Else, Prasad, 2017). Urban planning must not abuse technological resources but make use of them if necessary; for example, it is possible to exploit a technical contribution in the fundamental data collection and monitoring phase, in order to provide multiple solutions to critical issues that may be common to more problems. From a physical point of view, the city must be shaped according to existing flows,

Fig. 18: Levels of harmonization in the ecological design. This methodological approach tends towards a regenerating system (source: Mang P., Reed B., *Regenerative Development and Design*, 2019).

Fig. 19: The methodological structure of regenerative design (source: Mang P., Reed B., *Regenerative Development and Design*, 2019).
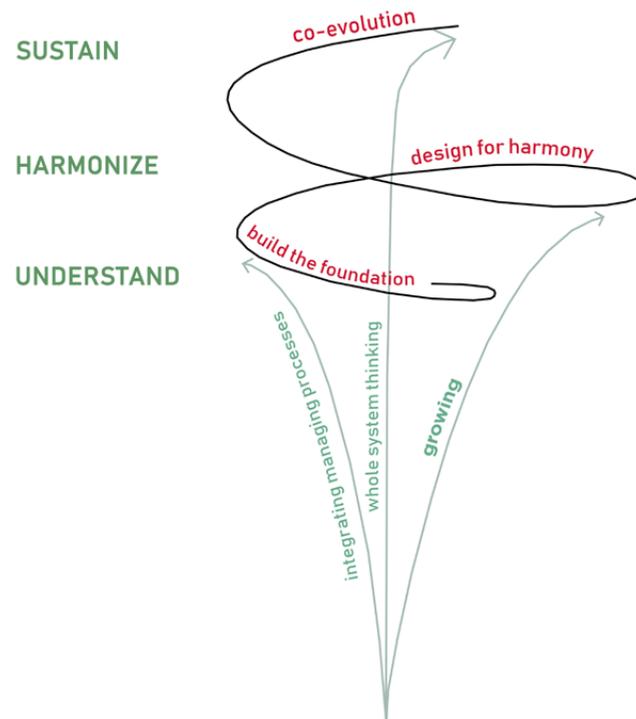
modelling the urban fabric to favour its processes and make them manifest; it is also essential to establish an order of priority among the interventions, favouring the implementation of the most sustainable ones. These principles combine to define the methodological matrix of the approach (Lyle, 1994). Operationally, regenerative development adopts a holistic point of view, overcoming the technical sectorialism and relying on multidisciplinarity; it aims to regenerate the metabolic capacity of ecosystems, reconstituting the natural capital and the energy heritage, in order to multiply the interactions between the physical and social elements. Furthermore, the approach pursues the logic of minimum intervention, recognising the value of the identity and cultural characteristics of the cities on which it is applied (Trombetta, 2018).

It is possible to summarise the intentions of the regenerative approach in some key objectives. In the first place, it is necessary to emphasise the places and their potential, studying the evolutionary dynamics in relation to the human presence. Regenerative projects must be defined by the ability to co-evolve the socio-cultural aspects, the environment and the built space. In turn, this capacity needs to be progressively increased thanks to the participation of all the members of the community, so that they can be a fundamental
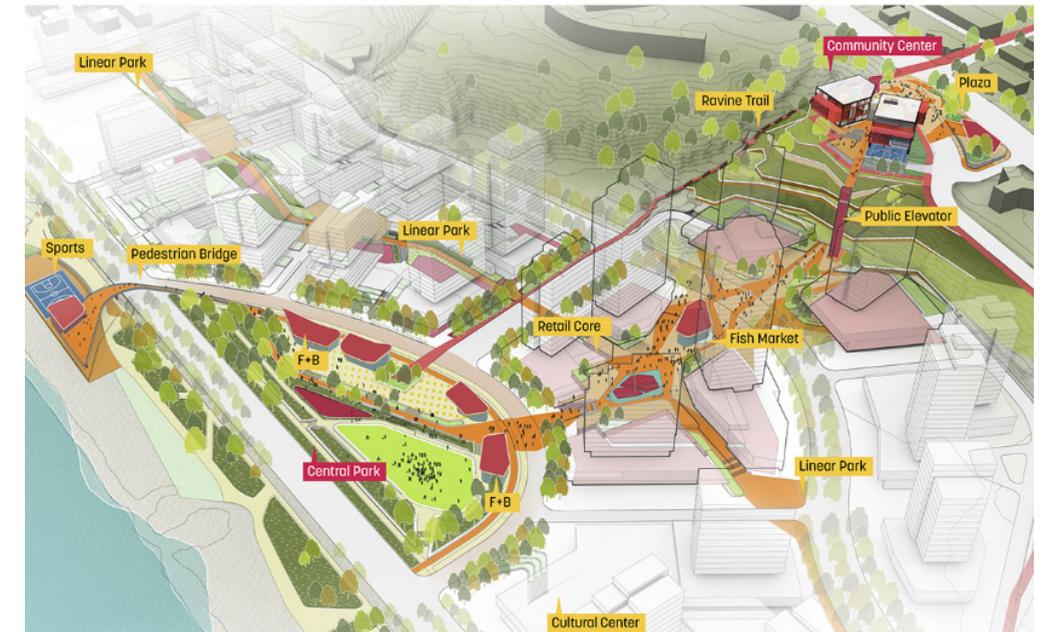
part of the city system on which they depend and which, for this reason, must be protected. The collaboration of the community with urban spaces is fundamental: as the gardener takes care of the garden, improving its quality by starting from its original value rather than shaping a new one from the beginning, in the same way citizens and urban planners must cooperate with the city environment, in

Fig. 20: Regenesis Group, *Las Salinas*, Viña del Mar, Chile. The project wanted to redevelop the brownfield connected to the gasoline industry, following the Regenerative Design principles (source: http://designawards.architects.org/projects/campus-and-urban-planning/las-salinas-an-ecological-and-urban-regeneration-in-vina-del-mar-chile/).

Fig. 21: Detail of the Las Salinas' Central Park by Regenesis Grop.

Community + Livability Focus

Cultural, retail and community programs underpin a diverse and holistic district, with ground-level uses contributing to the vitality of the public realm. A Linear Park reinforces the pedestrian armature within the neighborhood.

Fig. 22: Masterplan of the Las Salinas' coastal area (source: http://designawards.architects.org/projects/campus-and-urban-planning/las-salinas-an-ecological-and-urban-regeneration-in-vina-del-mar-chile/).

Engaging with Surrounding Communities

Fig. 23: Detail of the Las Salinas' Communitiy Centre.

the wake of its qualities, with projects that catalyse the regenerative development, through ecological and sustainable methods. Finally, the regenerative design must convey a process of constant harmonisation between the different parts of the territory, bypassing the scale limits and developing a system of indicators that can monitor,

Spaces for Social Integration

Framed by retail and cultural uses, the Central Park is able to host a range of civic activities that bring together the community of Viña. Cascading terraces create a neighborhood resilient to coastal storm surges.
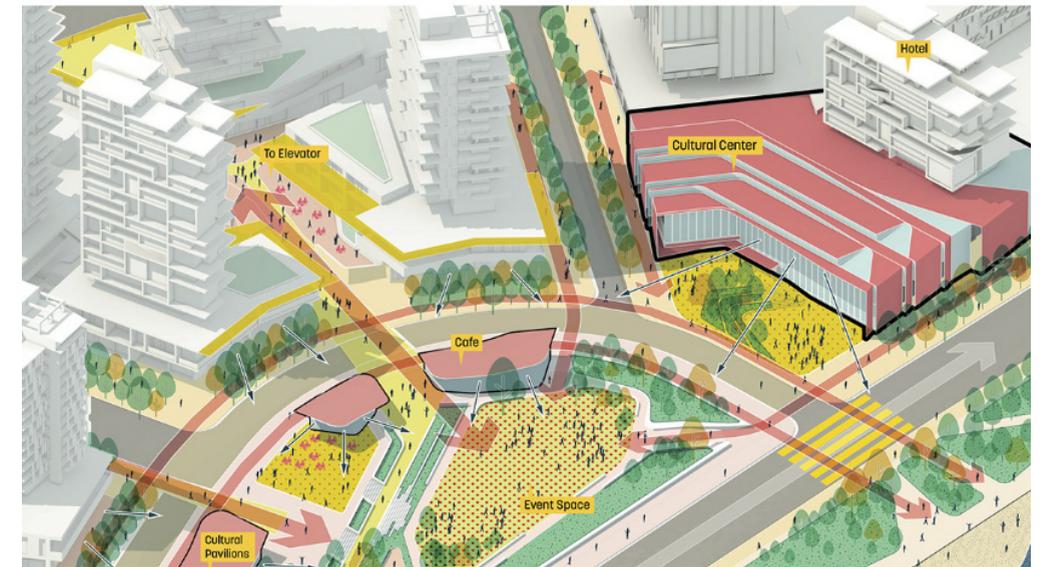
study and evaluate the dynamic and holistic process of urban evolution. (Mang & Reed, 2019).

In summary, the regenerative approach seeks to subtract the city from its crisis, protecting the natural systems on which it is based and supporting a wise planning of human systems, tending towards harmonious growth that generates mutual benefits for both natural and urban areas and aiming for resilience. However, the application of these principles still has to solve the challenge of feasibility, even at the economic level, and the uncertainty of long-term performance of the interventions, especially in relation to extrinsic factors such as climate change. Regenerative planning contributes to urban improvement also through the direct participation of users, thus pursuing a more capillary efficiency. Regenerative development, which is inspired by the natural ecosystems' capacity of self-healing and self-organisation, can, therefore, be an essential tool for finding a solution to the problems of today's city.
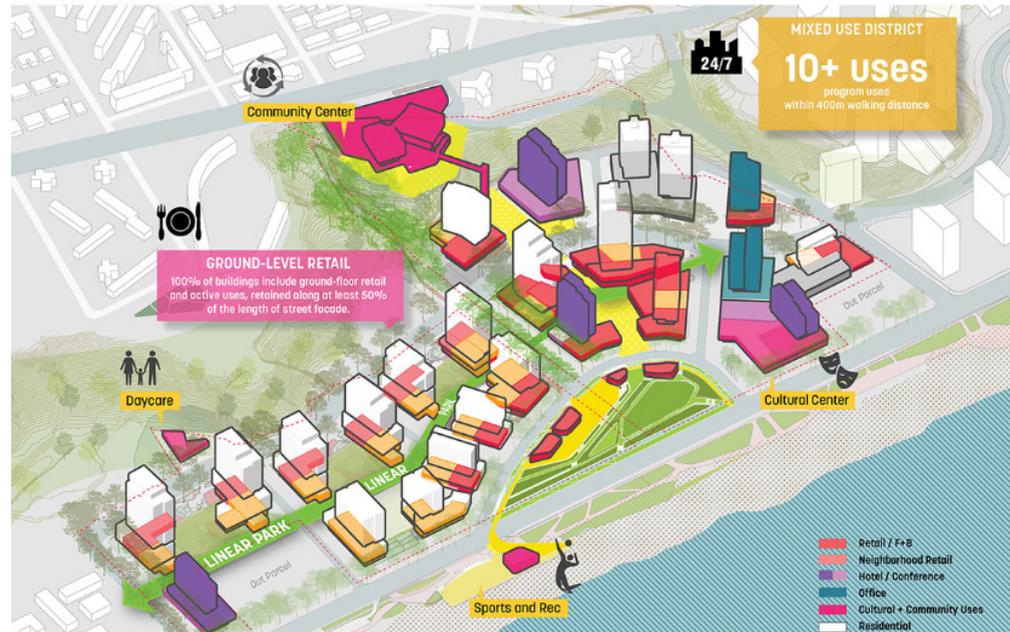
Fig. 24: Masterplan of the Las Salinas' Central Park (source: http://designawards.architects.org/projects/campus-and-urban-planning/las-salinas-an-ecological-and-urban-regeneration-in-vina-del-mar-chile/).

III. GREEN AND BLUE INFRASTRUCTURE

Keywords: *landscape urbanism, urban ecology, green-blue infrastructure, ecosystem services*

3.1 Landscape and Ecological Urbanism

The European Landscape Convention (2000) has broadened the concept of landscape, overcoming the implicit contrast between nature and culture expressed in the previous disciplinary debate, placing, however, considerable challenges in the path of implementation of the new conceptual approach. The introduction of the definition of landscape as 'a part of the territory as perceived by local communities and the result of the interaction of human and natural factors' requires a closer look into the relationship between nature and humanity (culture). More precisely, the landscape is made up of all the places of life, not only those considered exceptional but also the ordinary or degraded ones, it is the interrelation between natural and/or human factors and there is no longer a distinction between the two elements (articles 1 and 2). If the landscape becomes the quality of all places of life, then it is impossible not to consider the environment in its broadest sense, directing us towards a broader

Fig. 25: Forest fragments are connected by patches of rural-green infrastructure nearby Smisby, United Kingdom (source: Google Earth).

8 There is no space here for an examination of the roots and evolution of ecological urban planning. For a concise identification of the precursors of ecological urbanism, it could be useful to consult the studies of Spirn (2014).

9 The revision of the traditional triangle, composed by environment, economy and

Fig. 26: Composite "physiographic obstructions" (source: Ian McHarg, *Design with Nature*, 1969).

definition of landscape as a 'biocultural resource' (Scazzosi, 2017).

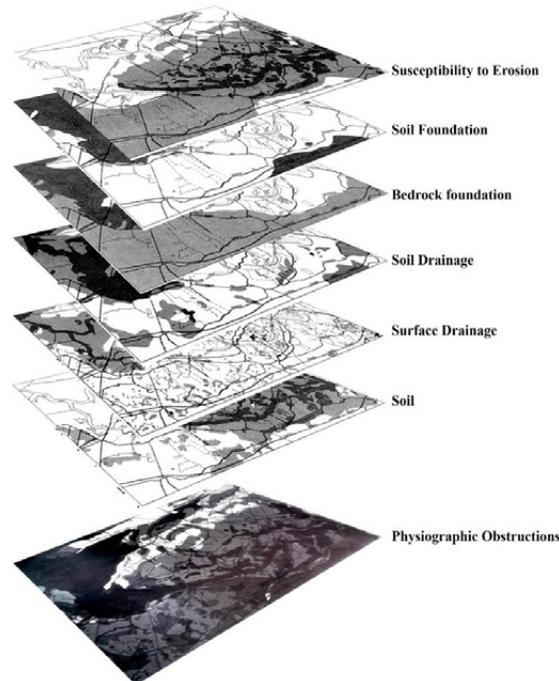The convention reports the reflection (theories, principles, methodologies) and consequently the action (policies, programmes, projects, plans) on a binomial always present in the urbanistic activity: how to design/plan settlements in the respect/conflict of the sites and the natural resources present. To mention only a few milestones, the roots of this debate can be found already in ancient urban planning and architectural design (Vitruvius) or the Renaissance (L. B. Alberti) until the dawn of modern urbanism (Howard, Olmsted) to then continue with Geddes up to McHarg in the 1960s8 (Spirn, 2014).

Taking the perspective of the design disciplines that deal with the city and the territory (first of all urban planning and landscape architecture) it can be argued that the new definition of landscape as an interaction of natural and human factors (human ecology) in light of social perception (culture) is an expression of the recent renewed interest of urban design in 'ecological rationality' (Viganò, 2013), through which it is possible to cope with the environmental and social crisis of the second half of the twentieth century and to achieve the objectives of environmental, economic and socio-cultural sustainability9 (Ljubljana Conference, 2003).

This renewed interest in the ecology/ urban planning relationship10 is also expressed by discussions in the international debate, led by *landscape urbanism* before, and the concept of *ecological urbanism* more recently, the latter conceived as a criticism and evolution of the former (Steiner, 2011).

Landscape urbanism deals with the recent challenges posed by human-space-induced changes in ecosystems and the recovery of territorial waste and degraded areas to be designed anew aiming at new quality landscapes. The main assumption of landscape urbanism claims the landscape should be the fundamental element on which to build the new city, while traditional urban planning has mainly dealt with settlements and infrastructures relegating green areas to few spaces, in the design of the city. Landscape urbanism

overturns the conventional planning approach and focuses on the interaction of natural and cultural processes that becomes the basis of the urban project11 (North & Waldheim, 2013).

The term Landscape Urbanism was officially introduced in 1997 at the University of Illinois in Chicago during the last part of the course led by Charles Waldheim in an attempt to reconcile two seemingly conflicting terms, almost an oxymoron, namely nature/landscape and city artefact. The distance between the two concepts had originated in the same rift, from the end of the nineteenth century, between the disciplines of landscape architecture and urban planning, the main research fields studying the territorial transformations (Padoa-Schioppa, 2017).

The debate on landscape urbanism, despite having developed a substantial disciplinary literature, boasts only a few concrete projects to take into account as examples, including the plan for New York City's Fresh Kills or the High Line Project in Manhattan. Both projects, the first developed on the area of a closed landfill and the second o on a disused railway line, represent new solutions for changing the contemporary landscape, the outcome of an urban regeneration that converts urban waste (*drosscape*) into public, tourist and leisure spaces.

The historical roots of Landscape Urbanism are certainly recognised in the work of McHarg (1969) although with some differences:

society, which characterises the concept of *sustainability* with the introduction of culture was formulated in Ljubljana in 2003 by the European Conference of Ministers responsible for territorial planning CEMAT (see Scazzoi, 2017).

10 In an international perspective, the term 'urbanism' takes on a wider meaning than our traditional urban and territorial planning, referring to the contemporary urban condition and above all to the practices of the design disciplines that are interested in territory, city and landscape. Compare with regard to Viganò P., 2013.

Fig. 27: The masterplan of the Fresh Kills Park in New York, designed by James Corner (source: https://freshkillspark.org).
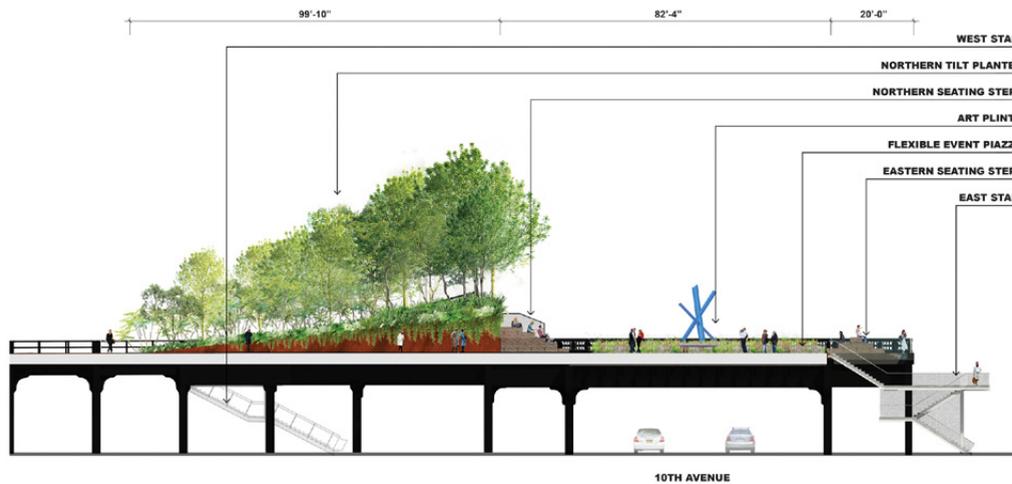
Fig. 28: Section of the High Line project in New York by James Corner (source: https://www.thehighline.org/photos/design/renderings-section-3-phase-2-spur/).

Fig. 29: Satellite view of the High Line (Source: Google Earth).

Fig. 30: View of the High Line's promenade (Source: https://www.asla.org/search.aspx?q=high%20line).

Fig. 31: Aerial perspective of the High Line park (source: https://www.artribune.com/report/2012/02/cicli-e-ricicli/attachment/10_recycle_high-lineny-c-iwan-baan/).

while the activity of the latter, taking root mainly in *regional planning* and introducing elements of ecology in planning, seeks to bring men closer to nature for a more careful use, Landscape Urbanism acts in open spaces, degraded or not, in order to transform them according to a multifunctional viewpoint, making different functions coexist in the same space (Steiner, 2011). McHarg's projects are concerned with vast natural areas to be valued and protected, while many Landscape Urbanism projects tend to integrate nature and men in the same space. To the already complex interaction of natural and human factors of the contemporary landscape, Landscape Urbanism also adds the richness of cultural and economic flows.

At the base of Landscape Urbanism is the awareness of the complex interconnection between socio-natural systems, where it becomes difficult to understand the innumerable iterations and the indirect results of localised interventions implemented on local sy-stems in close connection with wider systems. This awareness, all based on ecological approaches, exalts the project according to the indications of Landscape Urbanism, capable of facing the challenges of the contemporary hyper-complex space. The ecological matrix of Landscape Urbanism is, therefore, traced in its adherence to a holistic, multi-scale and interdisciplinary vision that considers the urban environment as a space experienced not only by natural agents but also by social, cultural and economic ones (Padoa-Schioppa, 2017).

Landscape urbanism has been criticised for some internal contradictions that have led to its recent terminological and conceptual revision, resulting in the term *ecological urbanism* (Mostafavi & Doherty, 2010) or *landscape ecological urbanism* (Steiner, 2011) acknowledging its implicit ecological philosophy. Steiner claims that in the last twenty years, starting in the mid-1990s, we have witnessed a progressive affirmation in the field of territorial design disciplines of Landscape Urbanism and urban ecology, but the latter, although widely cited, has been little practised in city planning/design.

Urban ecology is born in the realm of natural sciences and could be defined as a derivation of the most orthodox field of research on living organisms and ecosystems. The application of these scientific methodologies to the city, previously excluded from the field of observation, has led to interesting reflections useful

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Chromatic City. Applying s-RGB Design to contemporary space 49
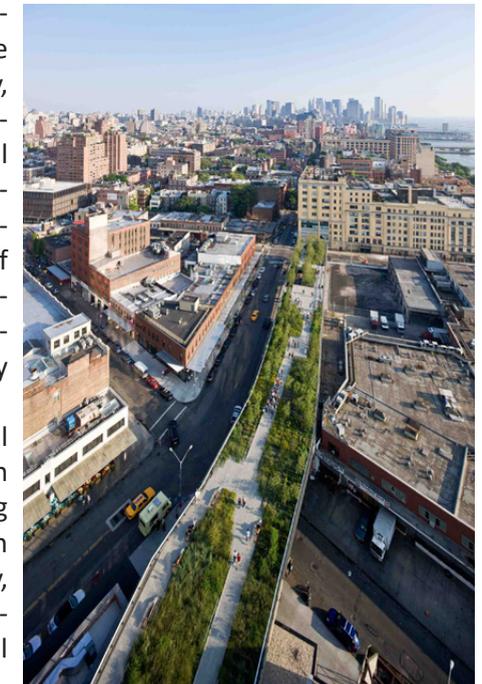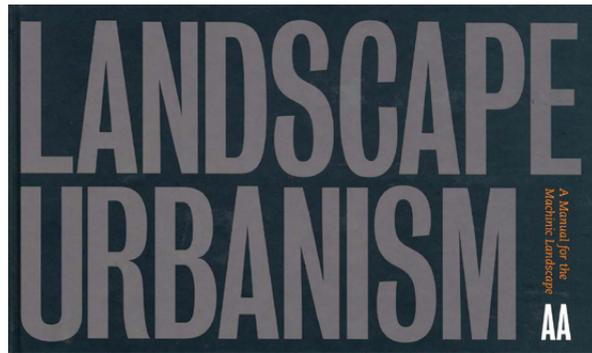
Fig. 32: Mostafavi, M., *Landscape Urbanism*, 2004.

11 In the essay 'Landscape Urbanism: A North American Perspective' in Pickett STA, Cadenasso ML, McGrath B. (2013), Alissa North and Charles Waldheim trace a brief historical summary of the evolution of Landscape Urbanism, identifying three main phases with the clarification of the fundamentals of design approach to the city and the landscape. We are currently in the third phase where ecology constitutes an interpretative/metaphorical model of urban evolution and which can, therefore, be used as a method for urban design through the landscape as a medium of transformation.

for design. In the first applications of ecological research in the city, elements of naturalness were traced within the urban system to understand organisms, habitats and processes. Later, the study horizon was expanded, considering the city itself as an ecosystem where more living species coexist in addition to man, whose interconnections with physical agents and other species are to be understood. Urban and territorial planning and design have conceptualised the process as the 'ecological adaptation capacity' of the human species to changes in its most welcoming habitat (the city). The city then becomes a system of flows of matter and energy (wind, solar radiation, etc.) from which humans and other living organisms draw.

Among the theorists who have revisited the concept of Landscape Urbanism, it is important to mention Mohsen Mostafavi who coined the term 'ecological urbanism' (Mostafavi & Doherty, 2010) in order to indicate a methodological approach for leading the conflicts between nature and urbanisation to synthesis. Urban ecology shows that the city is composed of different species, natural elements and constructed artificial environments that interact and still remain an ecosystem, even if dominated by man. The urban population has overcome the rural population for a few years, making the twenty-first century the first urban one: it will maintain this trend by concentrating population more and more in the cities, raising the consumption of energy and natural resources and, therefore, a sustainable and resilient solution must be found. The capacity for 'adaptation' of the human species, as territorial and urban planning has been defined, must be oriented towards the ecological planning of cities.

3.2 Green Infrastructure and Ecosystem Services

From scientific research and design practices carried out in the fields of urban ecology and urban/environmental planning as well as from studies on ecosystems, in the last twenty years the concept of 'green infrastructure' has emerged: according to systemic, holistic and transdisciplinary cooperation, it deals synergistically with issues

relating to the environment, biodiversity, the redevelopment of rural and peri-urban areas, hydraulic risk, open spaces and urban form (Benedict & Mahon, 2006; Mel, 2012; Beatley, 2012).

From the point of view of local administrations and urban planning, the environmental issues listed above, together with the lack of green spaces and leisure facilities and the need to increase sustainable mobility (pedestrian pathway), find an integrated solution in the green infrastructure's sustainable system.

According to the EU definition, the green infrastructures can be considered 'the networks of natural and semi-natural areas, strategically planned with other environmental elements, designed and managed so as to provide a wide range of ecosystem services'.

Fig. 33: Description of the potential elements composing the green infrastructure system (source: European Commission, *Building a Green Infrastructure for Europe*, 2013).

Green Infrastructures				
Corridors	Ecological	Dispersal	Networks	
		Migration		
		Commuting		
		Urban		
	Streams & Rivers	Wild	Orders	
		Urban		
	Swales	Natural	Orders	
		Stormwater		
	Bike/Pedestrian Paths	Recreation	Networks	
		Commuting		
	Boulevards			
	Utility Infrastructure		Networks	
Spaces	Habitat Preserves		Linked	
	Habitat Fragments		Networks	
	Constructed Wetlands	Stormwater	Linked	
		Wastewater	Linked	
	Parks	Regional	Linked	
		City		
		Neighborhood		
	Yards		Linked	
	Community Gardens		Linked	
	Green Roofs		Linked	
	Plazas	Civic	Linked	
		Commercial		
		Residential		

Fig. 34: Green infrastructure is a continuous multifunctional network of corridors and open spaces (source: Austin, 2014)

12 The word 'green infrastructure' was introduced in the United Kingdom thanks to the work of the PCSD (President's Council on Sustainable Development) and the DETR (Department for Environment, Transport and the Region's) in 1999-2000, distinguishing itself in part from the United States' definition regarding the thematic contents.

The concept of green infrastructure arose in the late 1990s in the Anglo-Saxon countries,[12] from which it gradually spread. The first theoretical and methodological definitions can be attributed to the EPA (Environmental Protection Agency) in the United States and to England's Community Forests network in the United Kingdom.

In the United States, the green infrastructure was initially configured as a specialisation of the ecological network for the enhancement of its ecosystem services, to which is added the defence against hydraulic risk. In Europe, green infrastructure has expanded its functions, becoming an instrument for integrating territorial planning and environmental enhancement (Benedict and McMahon, 2002, 2006).

The European Union in recent years has given particular impetus to the implementation of green infrastructures within the EU 2020 Biodiversity Strategy, in order to redevelop 15% of degraded ecosystems by 2020. It has also adopted the Green Infrastructure Strategy for the development of green infrastructures in rural and urban areas and, finally, the European Parliament[13] has adopted the 'Resolution on Green Infrastructures' (EU, 2013) commissioning a technical commission for the comparative study of some green infrastructure experiments in Europe, which led to the preparation of the Technical information on Green Infrastructure (EU, 2013), where the general aspects of the green infrastructure are outlined and the widespread implementation in the member countries is reviewed. These include some examples considered most complete: the ALGG 'All London Green Grid' in London, the 'Barcelona green infrastructure and biodiversity plan 2020', the French project 'Trame verte et bleue', the German 'Wiedervernetzungsprogramm', the Dutch 'Ruimte voor de Rivier' and the 'Lower Danube Green Corridor' in south-eastern Europe.

However, it can be said that there are still only a few experiments of multi-functional green infrastructures in Europe and, in particular, those with a regional or metropolitan dimension are rare. Currently we do not yet have a sufficient number of completed experiences useful to define in detail a model of intervention, scientifically and politically recognised in Europe, and the review of scientific literature

shows a complex and articulated picture of the situation(Hansen, van der Jagt, Olafsson, Pauleit, Rall, 2019).

In the research that attempted to construct an overview of the experiences (Scott et al., 2013), an experimental activity developed around the theme of 'connection of environmental systems' and the 'project of open spaces' (Malcevschi, 2010; Peraboni, 2010). Of particular interest is the attempt to illustrate the differences and the relationships between grey infrastructures and green infrastructures (Davies, MacFarlane, McGloin, Roe, 2006; NENW, 2009) which located the infrastructural-settlement policies in relation to the environmental ones and demonstrated how the two infrastructures are integrated and must consequently be designed together.

The researchers who support this thesis confirm the substantial difference between the ecological network and the green infrastructure: the first had the opportunity to develop a shared maturation of the concept based on policies and interventions carried out on natural extra-urban spaces, unlike the second that is more recent and has a greater difficulty of implementation, considering the multidimensionality, the close relationship with the urban fabric and the costs of implementation.

Green infrastructures are, therefore, more integrated with urban areas and it is this settlement and not exclusively environmental-naturalistic connotation that makes it more difficult to achieve. The relationship with urban planning and the management model is much more important for green infrastructure than for ecological networks (Escobedo, Giannico, Jim, Lafortezza, Sanesi, 2019).

Green infrastructures consist of the integration of multiple networks: the ecological network, the water network, the network of periurban and suburban rural spaces, the network of cultural heritage and leisure services and, finally, the slow cycle and pedestrian mobility network. The integration of these elements constitutes the connection grid integrating with the fragmented texture of the contemporary city and saturating the different aspects of the urban 'void'. In the USA, the consolidated practice of the 'project with nature' has led to the introduction in the planning tools of the green

Ecosystem Services
Air & Water Purification
Waste Decomposition
Soil & Nutrient Cycling
Clime & Radiation Regulating
Habitat Provision
Habitat Provision
Aesthetic & Cultural
Products

→ Green Infrastructure → Human Society
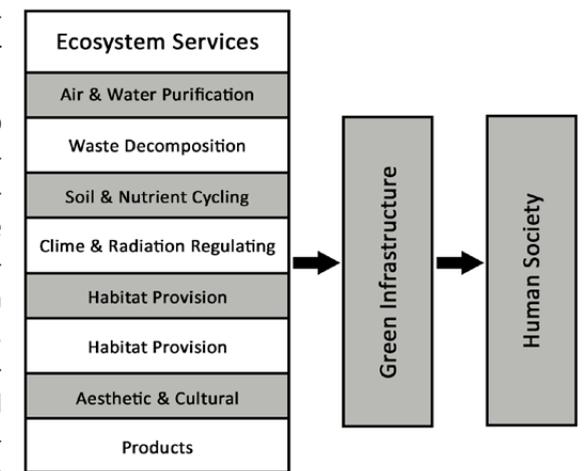
Fig. 35: The ecosystem services produced by green infrastructures for the benefit of man (source: Austin, 2014)

13 The European Union has currently defined two working groups: the first one has to contribute to the development of the European Policy on Green Infrastructures (2011), through the formulation of recommendations; the other one, the Working Group on Green Infrastructure Implementation and Restoration (2014), has the task of developing technical and guidance documents at national and regional level, from which a greater

spread of multi-functional green infrastructures is expected in the coming years.

infrastructure plan, which some of the main cities (New York, Detroit, New Jersey City, etc.) are equipped with and represent interesting construction models of urban connective networks for redesigning the landscape up to the declinations of Landscape Urbanism[14] (Almy, 2007; Corner 1996; Koolhaas, 1999).

The system tries to integrate natural and anthropic elements, the

Fig. 36: The Emerald Necklace by Olmstead, a chain of parks linked by parkways and waterways in Boston, Massachusetts.

14 The disciplinary debate on Landscape Urbanism is open and lively with critical points of view in favour of this approach (see in this regard Duany Andres, Talen Emily (ed.), (2013), Landscape urbanism and its Discontents. Dissimulating the sustainable City, New Society Publishers, Gabriola Island, Canada) on which there is no space here for a description. The debate on green infrastructures is also starting with critical points (see in this regard Daniel Czechowski, Thomas Hauck, and Georg Hausladen (ed.), (2014), Revising Green Infrastructure: Concepts between

latter expressed above all in the local identity (cultural heritage). In other words, the green infrastructure can be understood as a functional tool for the pursuit of the objectives of the European Landscape Convention and Ecological Urban Planning.

Green infrastructures aim to produce positive impacts on communities and the landscape, improving the well-being of people and ecosystems in general, involving environmental, social and economic aspects.

Looking at the past, a pioneer of green infrastructure design is certainly Frederick Law Olmsted, father of landscape architecture in America, who has created many large urban parks but has especially designed the Emerald Necklace in Boston, the first major project of a large-scale territorial park of the United States, with an area of 1000 acres. The park designed by Olmsted was multifunctional and had the objective of offering opportunities for recreation, ensuring control of hydraulic systems and enhancing/protecting natural spaces by restoring physical and social wellbeing to the inhabitants. Olmsted already argued, in the second half of the nineteenth century, that all city parks should connect to each other and to the surrounding

spaces of residential neighbourhoods. Later, his partner, Charles Elliot, further developed this indication, turning the Emerald Necklace into the Metropolitan Boston Park System (Austin, 2014) at the end of the century (1899). The example of the Boston park makes clear the functions and potential of the green infrastructures which have been adopted and developed also in the US garden cities and territo-

Nature and Design, Taylor and Francis/ CRC Press.
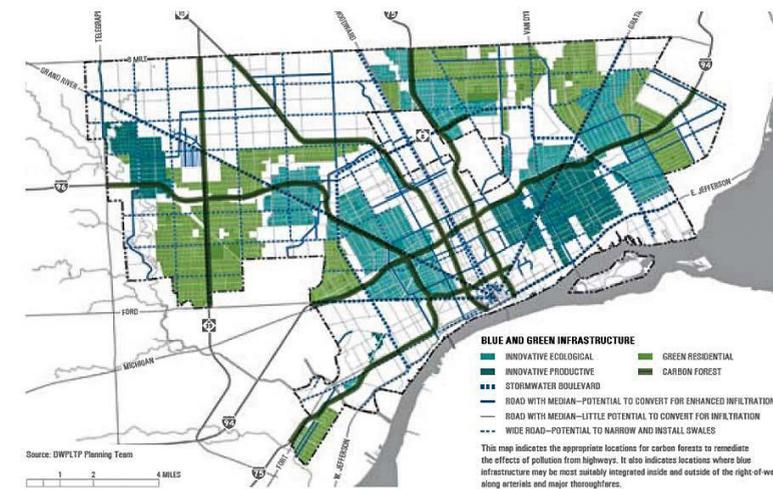
Fig. 37: Detroit Future City 2012: green and blue infrastructure scheme with list of components, the new 21st century infrastructure concept and an iconic regulatory framework for sustainably occupying urban voids.

rial parks of the 1960s (McHarg). Another significant example to remember is the Wisconsin Heritage Trail Plan project by Philip Lewis, a landscape architect: while studying and cataloguing the Wisconsin's natural and cultural resources, he realised that 90% of them were arranged along continuous corridors, thereafter defined by him as ecological ones. Therefore, on the basis of the results of his investigations, he suggested two useful guiding principles in the drafting of urban-territorial plans: the creation of territorial parks not only preserves natural spaces but can be useful to offer a wide range of other

functional and cultural services to local communities; on the other hand, the latter are spread over vast territories and pose instances of transformation and use of open spaces that are often coincident and closely connected, suggesting the need to create multi-functional and 'inclusive' green infrastructures.

The themes of the integration of human and natural factors, defence against hydraulic risk, protection of biodiversity, multifunctional supply of services, cultural enhancement of green corridors and, finally, the inclusive and democratic construction of green infrastructures are, therefore, already *in nuce* in many projects carried out sin-

CICES Section	CICES Class
Provisioning	Cultivated crops
	Surface water for drinking
	Groundwater for drinking
	Surface water for non-drinking purposes
	Groundwater for non-drinking purposes
Regulation & Maintenance	Filtration/sequestration/storage/accumulation by ecosystems
	Global climate regulation by reduction of greenhouse gas concentration
	Micro and regional climate regulation
	Mediation of smell/noise/visual impacts
	Hydrological cycle and water flow maintenance
	Flood control
	Pollination and seed dispersal
Cultural	Physical and intellectual use of land-/seascapes in different environmental settings
	Scientific/ Educational
	Heritage, cultural
	Aesthetic

Fig. 38: Key urban ES organised according to the CICES classification (source: Burkhard B., Maes J., *Mapping Ecosystem Services*, 2017).

ce the end of the nineteenth century, however, today, especially after the European Landscape Convention, they seem to have come into the public awareness of governments, administrations, institutions, associations and the technical design knowledge paradigm itself.

Closely related to landscape ecological urbanism is the concept of *ecosystem services* that are also provided through green infrastructures. Ecosystem services are the contributions of ecosystem structures and functions to human well-being and have been classified into four macro-categories (Millennium Ecosystem Assessment, 2005): life support services (nutrient cycle, soil formation and primary production), supply services (production of food, drinking water,

materials or fuel), regulation (regulation of the climate and tides, water purification, pollination and control of infestations), cultural values (aesthetic, spiritual, educational and recreational).

Ecosystem services demonstrate how much man depends on the regular functioning of ecosystems that transmit continuous flows of matter and energy to human societies. Ecosystem services are becoming a useful tool to support urban and territorial planning, natural resource management, environmental protection, environmental risk management and landscape design (Burkhard & Maes, 2017).

Many authors claim that the term ecosystem services (ES) was introduced in 1981, but the concept was widely discussed and used only during the 1990s by different professionals and researchers from distinct disciplines with increasing attention to their economic value. Therefore, from an initial, essentially ecological characterisation that measured the capacity of natural capital to provide support to human health and well-being in general, the ecosystem services have taken the measure of the benefits, including economic ones, that ecosystem functions can provide to human societies. From the mediation of these two concepts (ecological and economic) in 2010, the Economics of Ecosystems and Biodiversity (TEEB) defined ecosystem services as the 'direct and indirect contributions of ecosystems to human well-being'. In essence, the definitions, despite their different nuances, underline the relationship that exists between humanity and the natural world, of which we are in any case an inseparable part, and services represent the bridge that unites humanity and Nature (Costanza et al., 2014). Before the term 'ecosystem services', ecological science had coined the concept of 'ecosystem functions' in the late 1960s to describe the work and products carried out by ecological processes. Basically, the structures and processes of ecosystem development are able to exercise 'functions' that can be understood as 'services' (from which they are, therefore, distinct) only when people are able to benefit from them. In the 1960s, in parallel with the ecological scientific debate, in the social sciences the progressive recognition of the usefulness of nature for society takes shape and we begin to discuss natural functions, physical and spiritual values associated with society, tangible and intangible values related to cultural identity up to coining the term 'ecosystem servi-
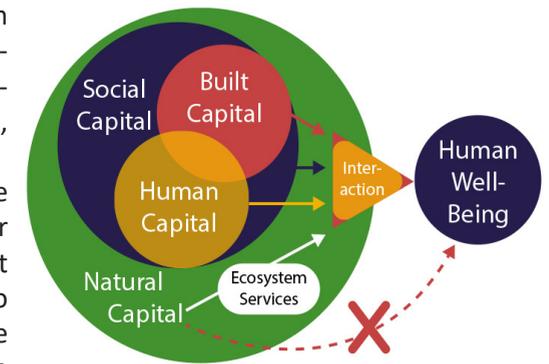

Fig. 39: Human wellbeing depends on Natural, Social, Built and Human capital. (source: Burkhard B., Maes J., *Mapping Ecosystem Services*, 2017).

Environment			The Social and Economic System
Supporting or intermediate services		Final services	Goods and Benefits

The 'production boundary'

Biophysical structure or process
(e.g. woodland habitat or net primary productivity)

Function
(e.g. slow passage of water, or biomass)

Service
(e.g. flood protection or harvestable products)

Benefit
(e.g. contribution to aspects of well-being such as health and safety)

Value
(e.g. willingness to pay for woodland protection or for more woodland, or harvestable products)

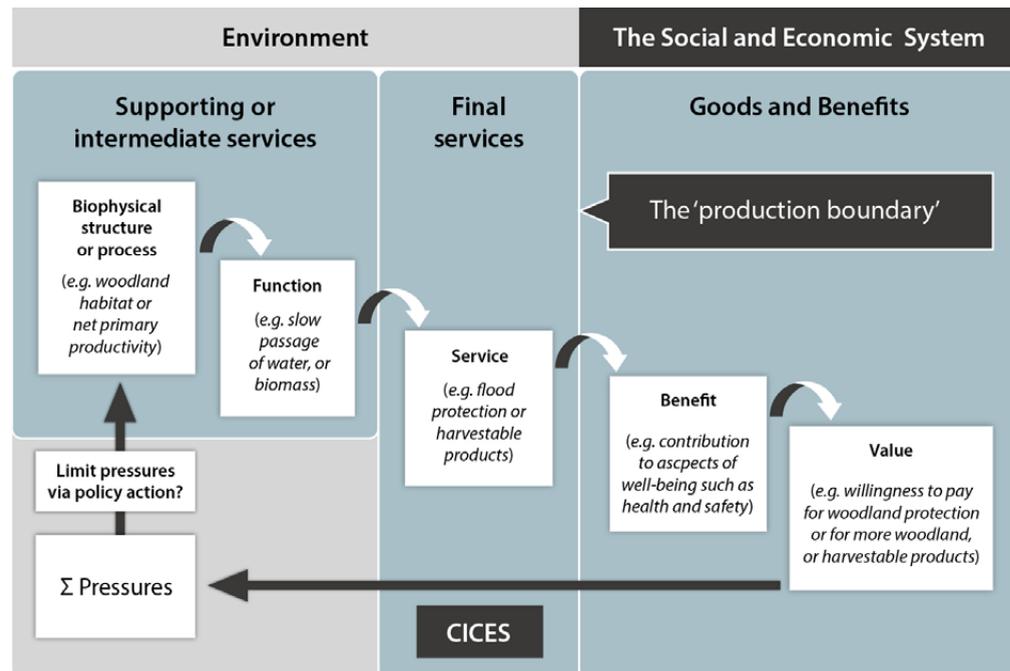Limit pressures via policy action?

Σ Pressures

CICES

Fig. 40: The cascade model describing how ES are developed and how society gains progressive interest in using them (source: Burkhard B., Maes J., *Mapping Ecosystem Services*, 2017).

ces' in this field at the beginning of the 1980s (Costanza et al., 2014).

Subsequently, Economics has been interested in ecosystem services especially with environmental economics (Pearce, 1993) since the 1980s. Therefore, the concept of ecosystem services has evolved from the first formulations to the current uses in the environmental and economic fields, in national and local policies, although there is still much to elaborate in order to develop techniques that can be used on a joint basis in territorial planning and landscape design. In 2005 the Millennium Ecosystem Assessment had the merit of disseminating the concept and officially locating it in the political agenda.

The ecosystem approach, therefore, makes it possible to categorise the benefits of green infrastructure, taking into consideration the elements that make up ecosystem services, namely water, soil, nutrients and organisms, in addition to socio-cultural and intangible components.

Investments in this area of green infrastructure can improve and protect habitats, guaranteeing proper support for biodiversity: this can also lead to better land management policies, guaranteeing non-use values for society, reflecting individual and collective interest in cultural and environmental preservation. An additional advantage of investing in the protection of ecosystem services is the maintenance of the critical risk situations which the city can incur.

Starting from these theoretical bases, the usefulness is evident of

a tool specifically designed for the analysis and evaluation of ecosystem services, or the *Green Infrastructure Valuation Toolkit*, which allows the development of interventions that best compare the total benefits with project capital and projected maintenance costs. The toolkit offers several calculator tools, in order to help in the evaluation of existing or project green infrastructures, studying the proposals in monetary, quantitative and qualitative terms.

While not evaluating the design quality itself, this tool identifies functions, benefits and impacts of a green infrastructure project, studying its value based on the ecosystem services it guarantees, and on the final economic revenue. In order for the assessment to be possible, the toolkit needs to analyse the expected effects and future influences of a given intervention on a green asset, establishing a logic chain with progressive steps that lead to the final result and to a definitive estimate of the ecosystem value.

From an operational point of view, the toolkit, therefore, provides three macro-phases, which are in turn further subdivided into different steps. The first macro-phase (*preparation*) aims first to collect information relating to the physical characteristics of the site and to the beneficiaries of ecosystem services and the green infrastructure project. This is essential to ensure a more accurate assessment and, for this purpose, information relating to the type, location and quantity of a green asset, in addition to its current and future uses, are needed. At this point, it is necessary to identify in a more detailed way the beneficiaries, estimating their number and type, precisely *users* (those who benefit directly from the green infrastructure) and *non-users* (those who enjoy the benefits indirectly): in fact, the benefits deriving from a certain ecosystem service depend on the use that individuals make of the green infrastructure. In most cases, the identification of the beneficiaries takes place through population or household density or catchment analysis.

The data collected so far is sufficient to process a primitive estimate leading to the second macro-phase

Fig. 41: Step-by-step guide for using the ES evaluation toolkit (source: *The green infrastructure valuation toolkit user guide*).

Preparation

1. Initial analysis
Scope and gather the information needed on the purpose, physical characteristics and beneficiaries of the project or site being assessed.

2. Beneficiaries estimation
Estimate the number of beneficiaries from the project or site being assessed. This will be needed for assessing recreation, tourism, health and property benefits.

3. Project data entry
Enter the core data required. Some information might be missing at this stage, but you will be able to complete data entry later.

Assessment

4. Key benefits identification
Identify the breadth of benefits likely to be associated the project or site being assessed. Benefits that can be quantified and monetised will be evaluated using the Calculator. Qualitative benefits will be captured through a narrative in you final return on investment case.

5. Applicable tools selection
Identify tools applicable to your project and check whether additional data entry might be needed to run the tools selected. Use the Cost-benefit assessment sheet to document your conclusions on the applicability of each tool.

6. Tools application
Work through the tools. Most will require manual input of additional data.

Reporting

7. Cost-benefit appraisal development
Develop a full cost-benefit appraisal, compiling and interpreting results from individual tools and evidence base review.

8. Reality-testing
Critical review: 'are you sure the results from the cost-benefit assessment make sense?'

9. Return on investment case
Write your return on investment case articulating the full range of benefits associated with the project or site assessed.

(*assessment*) which opens with a key benefits identification, defining the extent of the benefits associated with the site or project to be evaluated; then there will be a distinction made between the quantifiable benefits which will be monetised and the qualitative benefits whose value will be acquired in a descriptive way with value judgements.

Finally, the third macro-phase (*reporting*) develops a full cost-benefit appraisal, thanks to the classification and study of the information collected. It is an important phase because it tries to clarify the potential impacts and the benefits that cannot be monetised in order to show the quality of a green infrastructure project; in applying the toolkit, the strategic contribution of the investment must be considered in relation to local plans and objectives and to the context and scale of outputs. Although uncertainty can never be completely eliminated, this tool still allows a way to limit its influence, ultimately estimating a return on ecosystem services' investment (GI-Val: the green infrastructure valuation toolkit, 2010).

3.3 Green Infrastructure and Urban Regeneration

In relation to the question of urban voids in the broader meaning of drosscape, i.e. the contemporary city's waste areas in physical and social terms, the need for an ecological, safe and supportive city arises.

The territorial waste produced by the current economic crisis and productive reconversion are evident above all in the abandoned and degraded areas that are usually uninhabited or experienced by the marginal classes of society. The new urban question brings with itself environmental and social criticalities.

The rhetorical figure of the green infrastructure is certainly an element of strength of the new urban narrative aimed at designing the ecological city of the future, but the recovery of interstitial spaces in the vastness of the contemporary city, from the voids of the historical centres to the brownfields, to the fallow

Fig. 42: Increase in the hydrogeological risk in the absence of an efficient protective green network.

Natural catchment
Slow surface water runoff, infiltration into the ground
Evapotranspiration from vegetation and surface water
Groundwater recharge

Urban catchment
Rapid surface water runoff, limited infiltration into the ground
Reduced evapotranspiration from vegetation and surface water
Reduced groundwater recharge

Fig. 43: Cuma outskirts near Pozzuoli (NA). Metropolitan waste treatment area (source: Google Earth).

lots, to the peri-urban fringe up to the widespread city, cannot be resolved only by designing a green connective and multifunctional grid: it must also cope with the growing inequalities together with real and perceived insecurity in urban areas.

It is, therefore, necessary to enrich the instruments of contemporary urban planning not only with the necessary multidisciplinary integrations, above all of the earth sciences (geology, hydraulics, agronomy, etc.) for achieving pervading environmental objectives, but also with new investigation techniques of the real and perceived insecurity so that the new green grids, consisting of slow mobility, spaces equipped for sports and leisure, urban gardens, public spaces, which are effectively enjoyed by users, an expression of a social
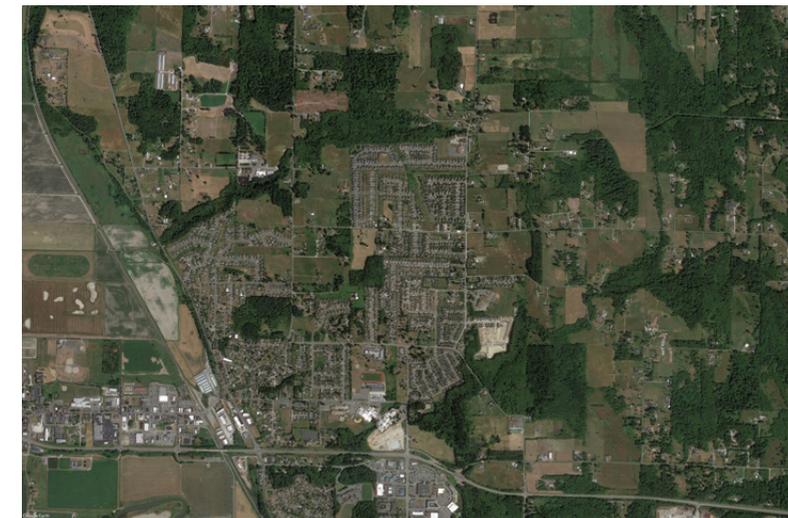

Fig. 44: Poorly planned expansion of suburban development of Stanwood, Whashington, has fragmented the original forest and altered the existing habitats (source: Austin, 2014)

Fig. 45: Abandoned quarries in the area of San Prisco (CE), "voids" that leave deep and permanent wounds in the natural landscape (source: https://www.researchgate.net/figure/Cave-abbandonate-nel-territorio-di-San-Prisco-CE-vuoti-che-lasciano-profonde-e_fig2_308895808).

mix that is as inclusive as possible (Anguelovski, Connolly, Irazábal-Zurita, 2018).

The concept of green infrastructure, conceived as a system of interconnected networks suitable for mitigating land consumption, must evolve, guaranteeing urban security and social usability, thus becoming *safer*.[15]

The interpretation of the territory as a wasteland opens up an innovative perspective in the culture of architectural and urban planning: disciplinary research is showing particular attention to the theme in recent years. Berger's *drosscape* induces us to consider the new contemporary context precisely as a representation of the system of abandoned and functional voids, in a view of the inverse city (Gasparrini et al. 2014) that can and must be recycled, reused by expanding the 1980s re-generation practices with a focus on envi-

Fig. 46: Illegal urban fabric composed by holiday houses on the Castelvolturno coast (CE), partially abandoned. Example of "vacuum" produced by exhaustion of a tourist cycle that spread in the 70's (source: Google Earth).
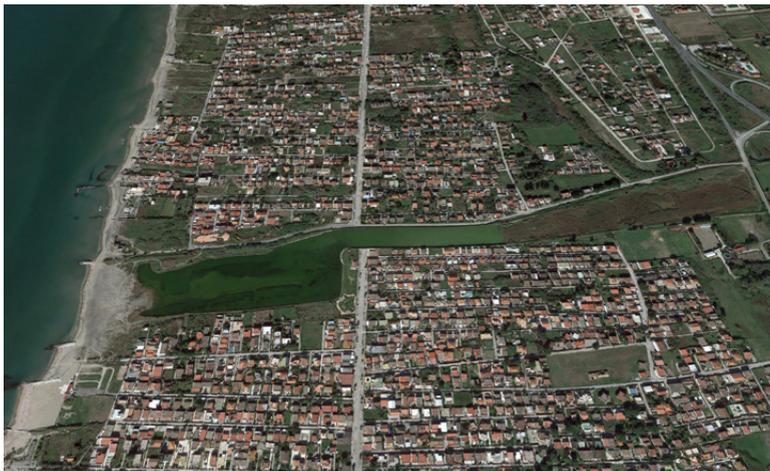

Fig. 47: Small-agriculture and ecological corridors connecting patches of green infrastructure in the Kanto region, Japan (source: Austin, 2014)

15 In the English language safety is defined in two terms: *security* which relates to personal well-being, and *safety* which represents a more general safe situation and refers to an environmental context. In this case, even if the disciplinary debate deals with the prevention of crime, the perception of environmental insecurity is the focus of interest and, therefore, it is the second meaning that fully expresses the insecurity in urban and territorial contexts.

ronmental issues and social inclusion.

The fragmented, porous, punctured contemporary landscape must be understood as a new infrastructure (Belanger, 2009) and new methods of classification and representation of the territory are needed, based on a new interpretative lexicon. Filling the gaps then means not only recovering abandoned sites or abandoned areas but changing the cultural approach to urban planning and taking care of the territory. To build green infrastructures not only needs specific plans and adequate funding but also a new attitude on the part of politics, entrepreneurs and citizens themselves is indispensable for management and maintenance over time.

Alongside the cultural leap, however, it is necessary to develop an innovative planning approach that can hold together a general vision of the systems on the territorial scale but also a accurate and targeted intervention, to the advantage of the multiscalar quality of the contemporary city project. Moreover, this change of course also requires a political commitment capable of supporting new modes of production and consumption (Pavia, 2014).

The general planning approach manages to hold together the constitutive networks of the environmental infrastructure and to imagine the continuous connective system positively saturating the gaps of the territory; the latter integrates with the prerogatives of the project that must be able to give concreteness to the social questions, not only in ecological terms, but above all in the use of space (urban security) and social inclusion.

The contemporary city proposes its project emergencies in the recomposition of its widespread and pervasive 'voids', in the diffe-

Fig. 48: The green-blue infrastructure can be designed at different scales to saturate different kinds of urban void.

rent meanings that recent research has produced, which are always representations of the waste that must instead redefine the constitutive plot of the soil project (Secchi, 1986).

In particular, the coastal areas, consisting of a mosaic of natural and rural spaces often marked by a dense hydrographic network (blue network) that flows into the coastal profile, often fragmented in uses and space, lend themselves to the design of green-blue infrastructures in order to reconnect the territory ecologically and give consistency of use to the activities as well as to provide ecosystem services. The green infrastructures have in fact also been created to face the hydraulic risk that particularly affects coastal areas, threatened not only by the floods of torrential/river waters but also by coastal erosion.

The new modes of interpretation and cartographic representation of the empty space are necessarily based on a multidisciplinary work capable of reading the different constitutive layers of the connective green infrastructure (blue, green, rural, cultural heritage, slow mobility); they require sensitivity also for the interpretation of social perceptions and insecurities (analysis and project/process for urban security) in order to deal in a complementary and integrated way with the 'waste space' and the 'overlapping life' of the contemporary city.
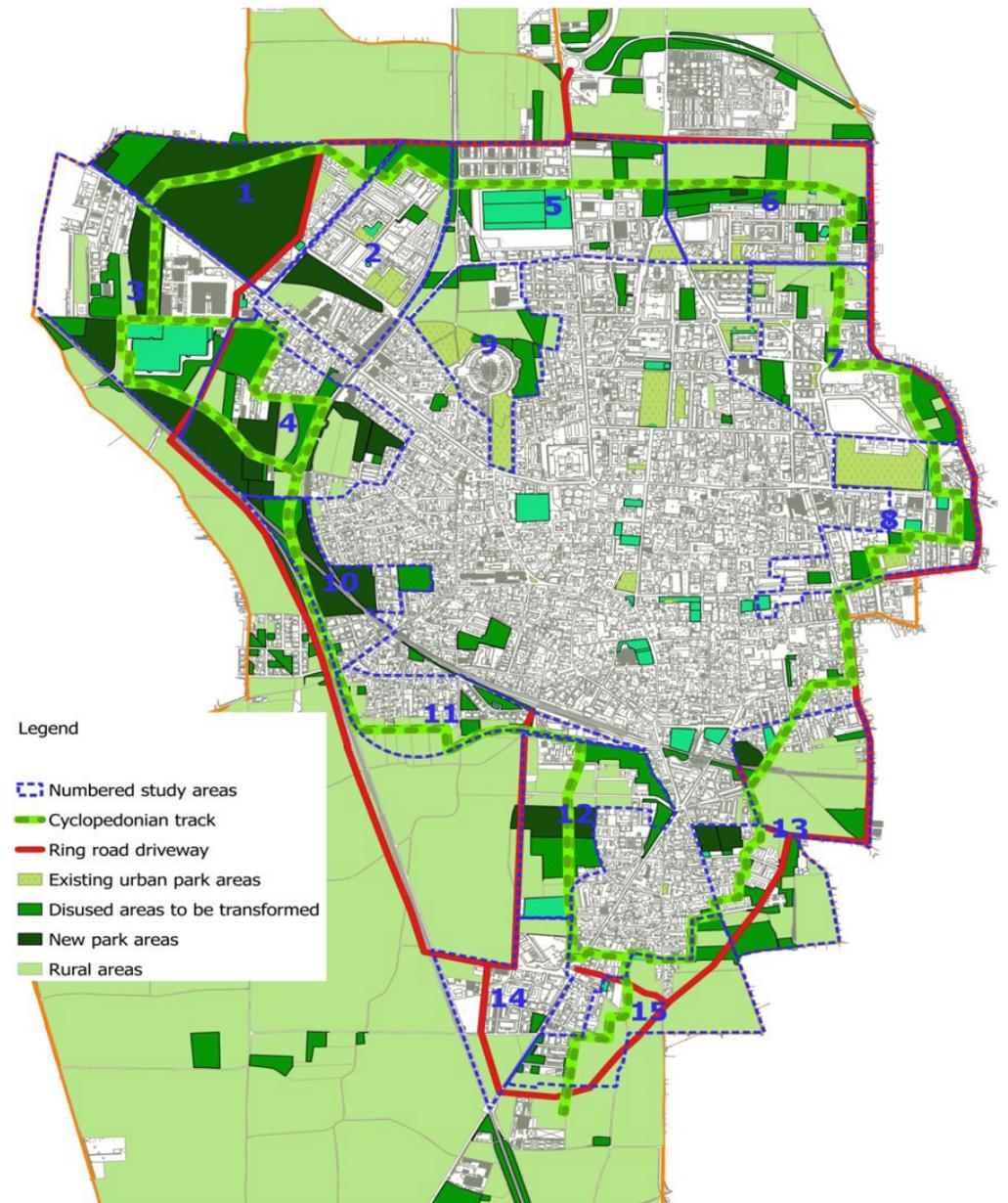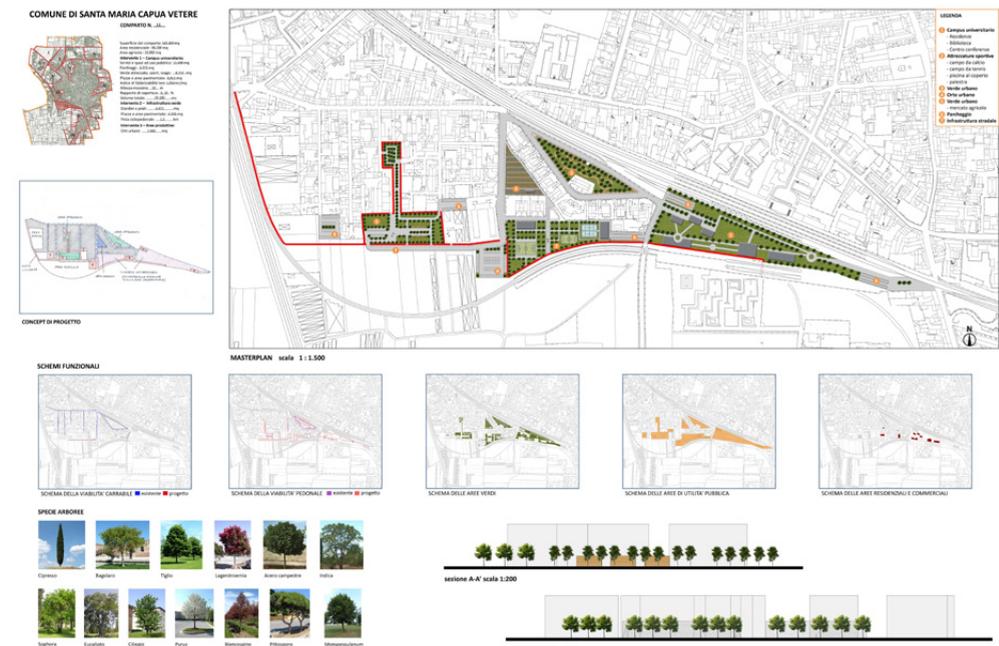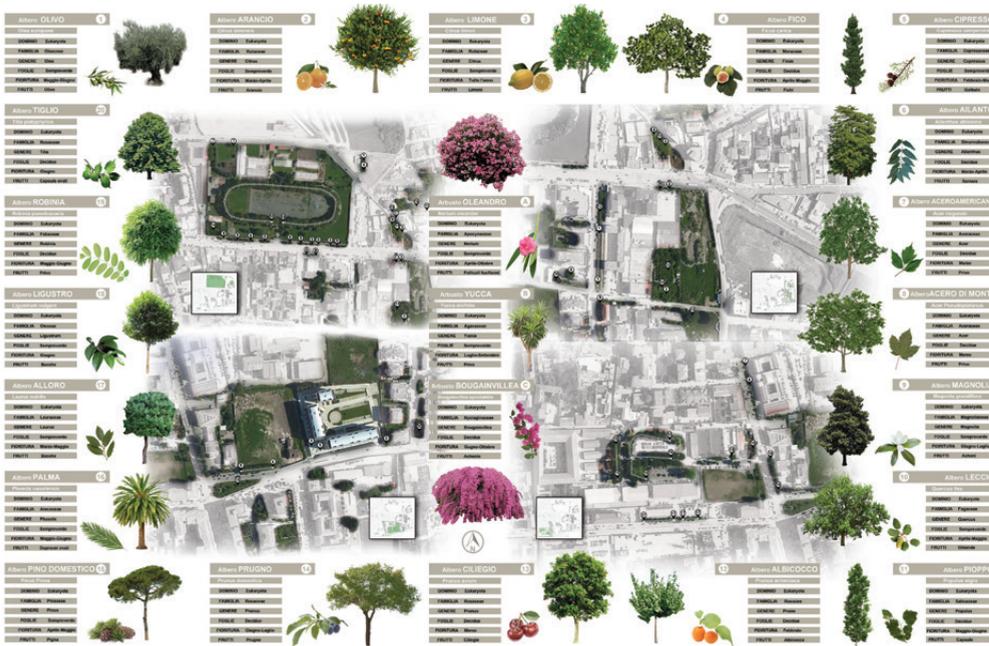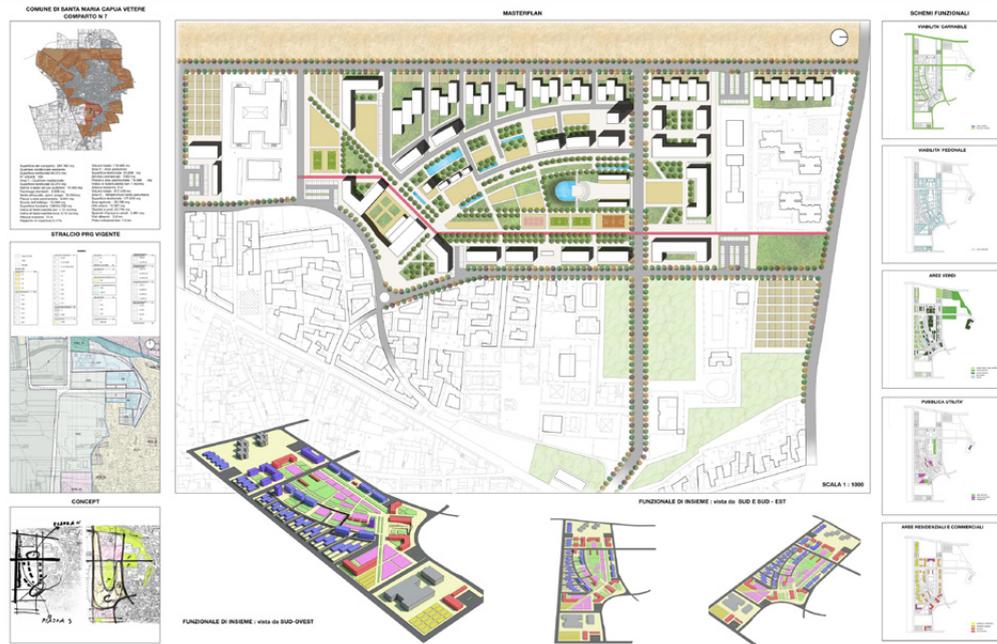

Fig. 49: Proposal of green infrastructure in the outskirts of Santa Maria Capua Vetere (Ancient Capua) near Napoli, developed in the academic course in Urban Planning and Landscape Architecture (proff. A.Acierno, P.Camilletti).

Fig. 50: Project details for the hypothesis of the green infrastructure for Santa Maria Capua Vetere

IV. MULTI-SCALAR DESIGN AND URBAN ACUPUNCTURE

Keywords: *multi-scalar, planning strategies, top-down & bottom-up approaches, urban acupuncture, tactical urbanism, third generation cities*

4.1 Multi-scalar approach

In the last decade, the increasing attention paid to the intricate new urban question has led experts and scholars to formulate new methodologies of approach and resolution for the problems of the contemporary city.

The dimensional component of the urban project, in particular, has generated a debate about the field of knowledge and the operational limits of the disciplines: this has led the planning research to move beyond the theoretical gap between the architectural project and the urban planning at the territorial level whose effect is the inability to analyse the complex urban reality outside of general principles and norms and rigid deductive schemes (De Solà-Morales, 1989).

The multi-scalarity, therefore, arises as a fundamental element of the ecological dimension of the project, indispensable for studying the different areas that inevitably intertwine with each other, generating a fusion of landscape-territorial, ecological-environmental and urban-architectural themes.

Considering the urban territory as a multi-scale assembly of complex and heterogeneous material elements and processes, it is possible to grasp both the physical and visible component of the city and its intangible and invisible part, linked to the social aspects of the community, involving citizens in the analysis as active protagonists in the settlement system. Moreover, in this way the space is understood as the sum of economic, socio-cultural and environmental issues that cannot be studied sectorially (Russo, 2011).

If it is true that today the urban crisis cannot be resolved within its walls, its spaces in the strict sense, but it is necessary to understand a territory that goes beyond the physical places typical of urbanisation, operating a mediation between the different scales of intervention
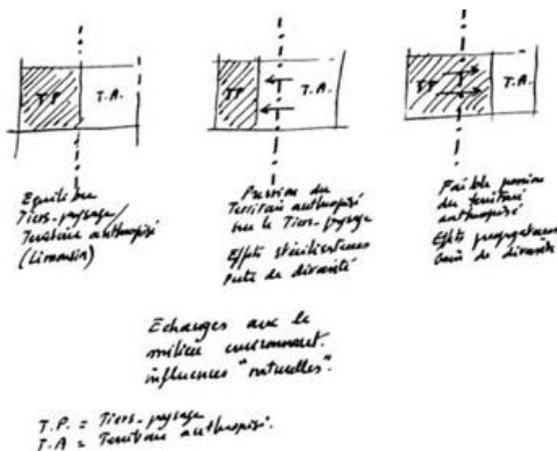
(Samonà, 1959), it is, therefore, indispensable that the urban project is endowed with a growing adaptivity to respond efficiently to rapid and unstable transformative processes of the physical and social fabric of the city, taking into account the multidimensional planning.

In this perspective, the concept of dimensional scale can be considered a useful cognitive tool for analysing the territory, as well as for interpreting and discretising the very elements of the urban fabric and their hierarchies. Therefore, in order for planning to be as optimised as much as possible, it will need to integrate the inductive method and the deductive method, increasing the quality of the different factors which, spatially combined in the urban grain, define the intrinsic nature of the city: the constant coexistence of an urban-territorial space and a social-proxemic dimension imply that the city cannot be considered as a simple incremental assembly of its individual parts, but rather as a multi-scalar product of physical, historical, cultural and economic processes (Russo, 2014). Especially in relation to the landscape in which cities fit in, it is impossible to refer to a particular scale: the landscape itself crosses the different scales of representation, defining, rather, families of practices that are able to operate on multiple levels. Think of the marginal spaces of the urban territory, the abandoned or disused and functionally degraded areas that flow into the 'Third Landscape' which has no defined scale, but which can be read in a multi-scale manner, using observation tools ranging from the satellite to the microscope, in a genuinely ecosystemic perspective (Clement, 2004). On the other hand, even the physical form of the settlements is influenced by multidimensional processes: the infrastructures draw the boundaries and the internal links, relating to different macroscopic territorial areas, while the nodal points mark the focal areas on the local scale fabric, offering the possibility to the designer to develop interventions aimed at the localised improvement of the city.

Regenerating, therefore, implies a continuous need to change scale for immediately identifying the general master plan to be implemented, while maintaining the ability to focus on focal points of the city, alternately intervening from above and below. In this perspective, the concept of a multi-scalar approach is inserted as a progressive virtuous path for rege-

nerative practice. This approach goes beyond administrative limits, establishing a multi-level decision space; it also has the peculiarity of reconstructing the identity of the places, making it suitable, for example, for the regeneration of the peri-urban areas that the urbanisation has previously strongly fragmented, making the boundaries between city and countryside increasingly blurred: by studying the social and physical morphology of the spaces, it is possible to find a real solution for the unsolved spaces of modernity.

Multiscalarity aims to exploit the potential of the *bottom-up* approach and at the same time the advantages of the top-down approach. The bottom-up approach starts from the social base of the city, channelling the interests of the inhabitants. According to this criterion, the planning action must make use of listening to the population which becomes an important cognitive-operational tool: in fact, social participation is fundamental, facilitating more focused and effective planning. The final objective is the recognition of the focal points of the urban fabric towards which the interventions are directed. The top-down approach derives instead from technical-governmental procedures. The planning process works on a large scale, identifying urban macro-objectives. The contribution of experts from different sectors makes it possible to achieve a multidisciplinary plan according to multiple perspectives. The ultimate goal of this approach is to create an urban-territorial strategy that involves the city as a whole.

It must however be pointed out that multiscalarity must not result in canonically pursuing progressively more detailed levels, following the logic of the telescope, but must involve a synchronic vision of territorial strategies and urban neuralgic areas, in a process of constant abstraction and verification (Secchi, 1989).

4.2 Bottom-up practices: Urban Acupuncture & Tactical Urbanism

In recent years, practices for the rehabilitation of the marginal, abandoned and under-utilised spaces of the contemporary city are spreading. These consist of small interventions, often on public gardens, squares, disused buildings and urban blocks, in which local communities are involved, who are able to attribute new uses and functions by activating urban regeneration. They represent new collective practices able to produce the transformation of places, quickly and at low cost, also supporting the construction of informal

Fig. 51: Sketch by Clement describing natural exchanges between Third Landscape and Anthropized Territory. From left balance situation, strong pressure from the T.A. (loss of diversity), weak T.A. pressure (increase in diversity)

Fig. 52: Urban Acupuncture consists in the insertion of design needles in the urban focal points (source: http://needlecrowd.com/tag/urban-acupuncture).

networks of citizens.

The innumerable practices created in recent years can be grouped into antagonistic and collaborative approaches (Galuzzi, Magnani, Solero, Vitillo, 2019): the former consist of interventions based on the participation of citizens in bottom-up actions of protest mainly developed outside of the rules of institutional planning, these include movements belonging to *Do It Yourself* (DIY) *Urbanism* such as *Placemaking, Guerrilla Urbanism, Pop-up Urbanism* and *Urban Hacking*; the latter consist of movements developed from the bottom but recognised and integrated into policies of the local administrations.

The collaborative approach can be mainly represented by the practices of Urban Acupuncture and Tactical Urbanism (Fredericks J., Caldwell G. A., Foth M., Tomitsch M., 2018).

Fig. 53: Example of *Do It Yourself* Urbanism (source: https://www.transportxtra.com/rudi/intelligence-education/case-studies/50802/diy-urbanism-build-your-own-community/).

The participatory nature of urban acupuncture, a design tool that spreads simultaneously to different parts of the globe and allows targeted interventions to be carried out, lends itself well to methodologically integrating with multi-scale regeneration.

The analogy that is established between this approach and medical practice is evident. Analogous to needles inserted in specific points of the human skin, targeted projects will act to restore the energy flow of the city, thereby stimulating the well-being of the entire urban body: successful planning will aim to increase the city's responsiveness by generating a positive chain reaction, making urban revitalisation an indispensable tool for the systemic functioning of the city (Parsons, 2010).

The acupuncture intervention initially aims at solving local scale problems: the benefit generated tends to spread later to a greater area. The point of view adopted is the perspective of citizens in order to identify their needs; subsequently, the potential of public space is analysed with the purpose of regenerating degraded areas. It can be said that acupuncture is comparable to *micro-planeación* precisely

Fig. 54: Drawing elaborated by Marco Casagrande's studio about urban acupuncture and regeneration (souce: https://helsinkiacupuncture.blogspot.com/?m=0).
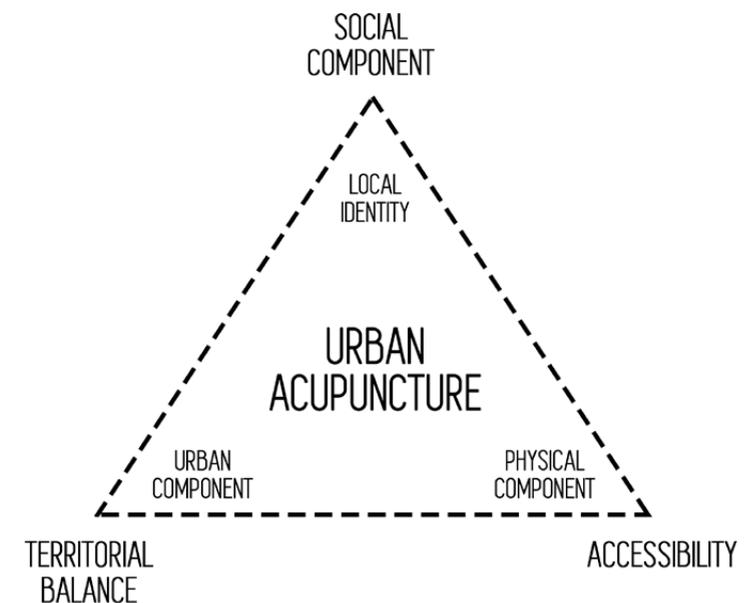

Fig. 55: Urban acupuncture components and characteristics (source: Kapstein & Ramírez, 2016).
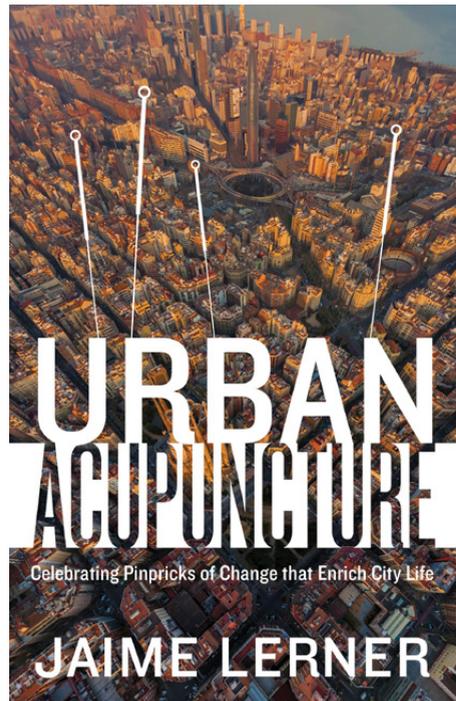
Fig. 56: Lerner J., Urban Acupuncture, 2003

because it relates to a type of small-scale planning, being in fact composed of small localised interventions. The purpose of the *micro-planeación* is the establishment of a process sized to the right scale in order to incentivise the local administrative capacity to structure efficient design work through an adequate and responsible decision-making process (Kapstein & Ramírez, 2016).

The term urban acupuncture was initially coined by the Spanish architect and urban planner Manuel De Solà-Morales who believed that the approach could solve the problems of the city through localised and short-term interventions, more or less spontaneously, enhancing the value of the surrounding areas. He was the first theorist to hypothesise the parallelism between the urban grid and the energy paths along which urban acupuncture operates, reasoning on the concept of scale of intervention; however, particular attention was paid to the operational priority in the choice of project actions. Jaime Lerner, Brazilian designer and politician, continued De Solà-Morales' studies on the subject, deepening the concept of urban reaction of the city's focal points to project needles, inserting active social participation

Fig. 57: Taipei organic acupuncture, drawing by Marco Casagrande to identify the most sensitive points of the urban tissue (source: https://architizer. com/projects/ taipei-organic-acupuncture/).

in the methodological process. According to Lerner, urban acupuncture can also be applied transversally to design practice, through art, music and lighting, thus also taking care of perceptive and security aspects. At the base of his reasoning there is also an economic matrix: the interventions must generate a monetary return and a financial re-flowering to be considered valid; moreover, he is a supporter of the speed of application as the basis of the approach that fits well in the wake of the aforementioned criterion (Tang, 2016).

The most recent urban acupuncture theorist is the Finnish architect Marco Casagrande who has given a more practical and architectural value to the approach. He supports the existence of a connection between man and nature. With regard to this relationship and the condition of the current city, it is interesting to look at the concept of 'Third Generation Cities'[16]: the history of cities revolves around a cycle, composed of three temporally consequential passages or *generations*, during which the relationship between man and nature has been progressively altered by the progress of the industrial society whose outcome has been degraded spaces and abandoned areas, along with spatial and social fragmentations, which need to be reintegrated into the urban-environmental network (Casagrande, 2013, 2019). The interest in planning sustainability has led Casagrande to define urban acupuncture as an efficient operational tool for the recovery of urban waste.

Although urban acupuncture has found applications that are geographically distant from each other, its theory can still be summarised in eight fundamental principles that guarantee its operational translation.

The first objective consists in the determination of the sensitive points, or those points on the urban skin where the flow of positive energy of the city encounters an architectural, social or economic obstruction: it is a preliminary but neuralgic operation since it identifies since from the beginning the physical places on which to act (De
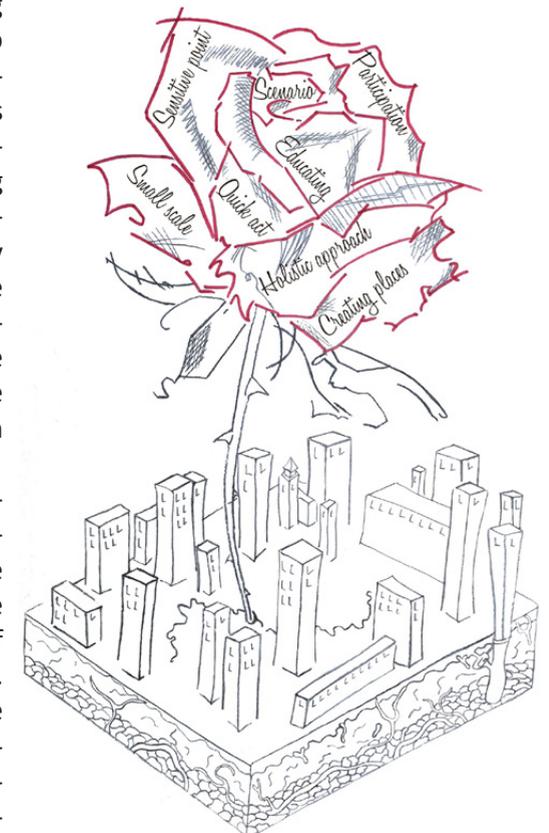

Fig. 58: The urban acupuncture as a rose in the concrete. On the petals, there are its eight main principles (souce: Hoogduyn, 2014).
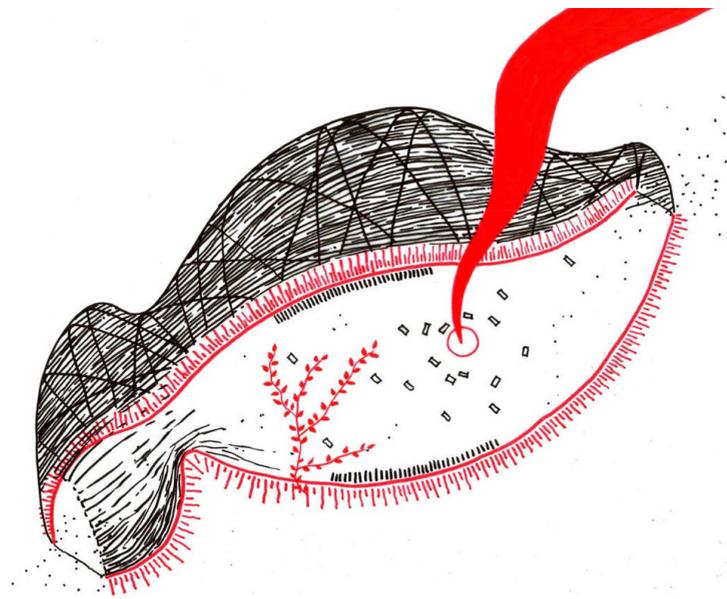
Fig. 59: Bug Dome by WEAK! in Shenzhen, a bamboo shelter for hosting performances and discussions during the SZHK Biennal and then as gathering place for illegal workers (source: By Movez - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=1744 3441).

Fig. 60: Concept of the *cicada* structure by Casagrande, similar to the Bug Dome (source: https://www.archdaily.com/203750/cicada-marco-casagrande/50058c552 8ba0d0779000760-cicada-marco-casagrande-drawing-01).

Solà-Morales, 2008).

The second criterion, instead, leads to the definition of a scenario. This need arises from the designer's necessity to illustrate to the local population the different connotations that a certain intervention can entail: a domino effect is thus created that progressively and actively involves all the social classes, encouraging their interest. This clearly results in a more effective pursuit of benefits.

The third principle theorises the quick act. Acupuncture needs rapidity and precision: it would be impossible to think of needles inserted with painful slowness in the patient's body. The same re-

asoning applies to urban acupuncture, which must respond quickly to the real need of the place, retaining a character of flexibility and reversibility (Lerner, 2014).

The principle of participation undermines the concept of design hierarchy, opening up new perspectives through the direct integration of citizens' ideas and needs (Ghosh & Saha, 2019).

The fifth point concerns a reciprocal process of educating between the designer and the population: while the former manages in this way to immerse himself more deeply into the reality of the city, the latter can further increase the knowledge of what it actually needs.

Fig. 61: Urban acupuncture for the Winschoterkade in Groningen by Manuel De Solà-Morales (source: http://www.staatingroningen.nl/82/herinrichting-winschoterkade).

Fig. 62: Treasure Hill is a community in Taipei, Taiwan. Originally an illegal settlement, Casagrande's acupuncutre positively restored it and made it an Artist Village (source: http://neocha.com/magazine/treasure-hill-artist-village/).

In this perspective, the primary importance of children's education to a real urban conscience appears logical.

The last two points mentioned flow into the practice of the holistic approach. Any type of intervention, in fact, must not remain a simple vision of the architect or urban planner who designed it: all the disciplines that contribute to the spatial arrangement of the territory must share their vision, in order to establish a strategic integration with citizen participation. This allows us to focus on the fundamental elements of the intervention site, such as ecology, economy, transport facilities, culture, history and politics, in a manner that captures the perspectives towards which the society is heading (Hoogduyn, 2014).

According to the seventh point, in order for urban acupuncture operations to be effective, it is essential to define the right scale of intervention. It could be said that this technique aims to generate

a greater impact the more localised the design needle inserted in the urban fabric is. With regard to this principle, the thought of De Solà-Morales is illuminating: the scale, in fact, is proportionate to the extent of the proposed transformations, as well as to the financial inputs.

Finally, urban acupuncture pursues the principle of *creating places*. The task of acupuncture is the creation of places starting from spaces that previously had no value: this is possible by searching for the potential wealth of the site. Only in this way it is possible to identify, moreover, the richness of meaning that a particular place contains within itself. This practice stimulates urban planning, thus rebalancing the equilibrium between architecture and city activities (Hoogduyn, 2014). In this sense, it is worthwhile mentioning the regeneration project of the *favelas* of Curitiba, Brazil, by Jaime Lerner, dating back to the 1990s. The plan involved the construction of primary urbanisation works, of which the neighbourhood was drastically lacking, although it was impossible to operate in any way below the ground level due to a serious risk of landslide. Using the handrails of the intricate but capillary routes inside the shanty town, Lerner integrated the hydraulic and electrical network with them, concealing instead the sewage system's pipes at the base of the roadway: with this stratagem, he managed to reach all the dwellings of the area. Moreover, in order to increase the social value of the site, some spaces have been converted into commercial centres with tax breaks, thus attracting investors who quickly helped transform the place in a positive way, giving it an identity and making it an urban centrality.

4.3 Acupuncture & Urban Regeneration

The practice of urban acupuncture can be divided in two different types. The *acupuntura de intervención* aims to revitalise a portion of the urban surface, creating new spaces and meeting points and improving accessibility; the *acupuntura de percepción* consists of interventions which are not necessarily included in urban strategies, but allow the site to return to its local identity, facilitating the citizen in understanding the places that are proper to it through collective memory (Ramírez, 2014). In this context, Lerner proposes the concept of memory acupuncture, in that the value of identity and the sense of belonging are important urban points of reference that the citizen has to recognise his own city.

Note that, generally, the two types tend to be complementary

16 According to the Third Generation Cities theory, in the first generation, architecture appears humble and totally dependent on the environmental and natural processes in which it is placed; during the second generation, on the other hand, man consistently exploits environmental resources, generating an industrial city that overlooks and damages the surrounding nature, now considered unnecessary; the third and current generation is characterised by a radical change of course, according to which nature rises again above architecture. The citizens themselves, according to the permitted methods, ideally destroy the previous industrial city: the consequent integration of post-industrial ruins with the natural context leads to the creation of a 'new urban organic machine'. The gradualness of the process of overcoming the industrial age indicates the restorative role

of nature which attempts to remedy the design errors to which we owe today's imbalance between the urban element and the environmental component. According to this line of thought, the progression from one generation to another follows the changing and not always equally balanced relationship between the urban growth's intrinsic forces of growth and sustainability.
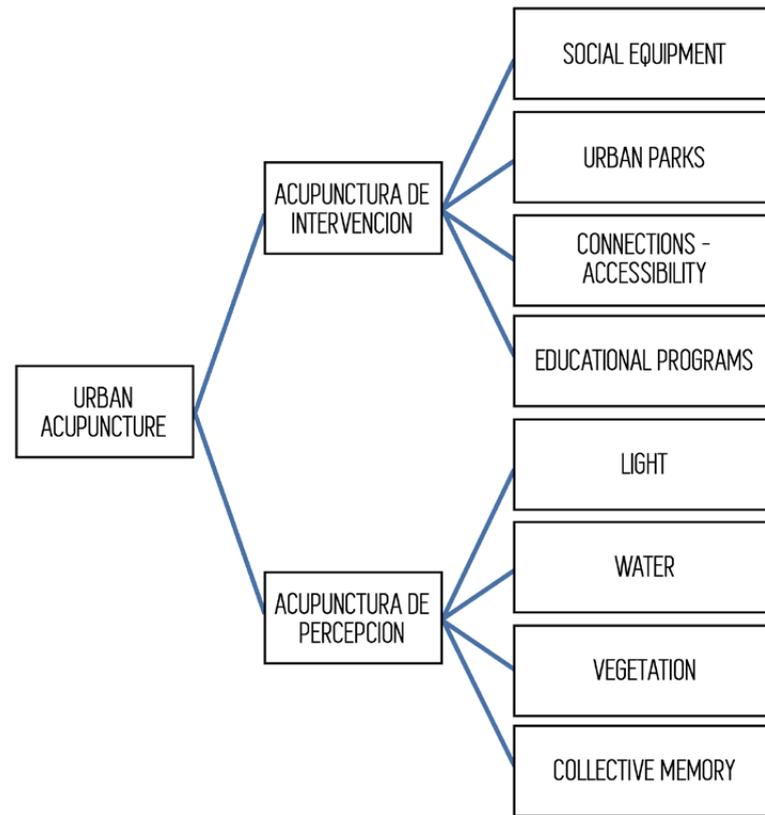
Fig. 65: Different kinds of urban acupuncture (source: Kapstein & Ramírez, 2016).

and corroborate the most vulnerable areas of the urban fabric. Vulnerability is strongly connected to the crisis generated by the complex alignment of problematic factors with which the city is forced to confront, such as social inequalities, the degradation of the physical environment and the fragmentation of urban space: according to this definition, acupuncture is used to mitigate urban vulnerability, in relation to the social, urban and physical-natural aspects that this method attempts to reconcile (Kapstein, 2010).

The need to direct the design efforts towards a greater attention for the areas at risk appears evident, as does the urgency of mending the worn edges of the city. Regeneration, therefore, becomes the objective of the future urban strategy: this practice is defined as the set of integrated actions that, applied to the same crucial points, aim to curb the dynamics underlying the decline, reactivating the local capacity to face urban, economic and social changes (Alguacil, Hernández, Medina, Moreno, 2000).

Regenerating also means bridging the urban gaps: Lerner's contribution makes it possible to understand the need to restore continuity in the urban fabric, since many of the main urban problems
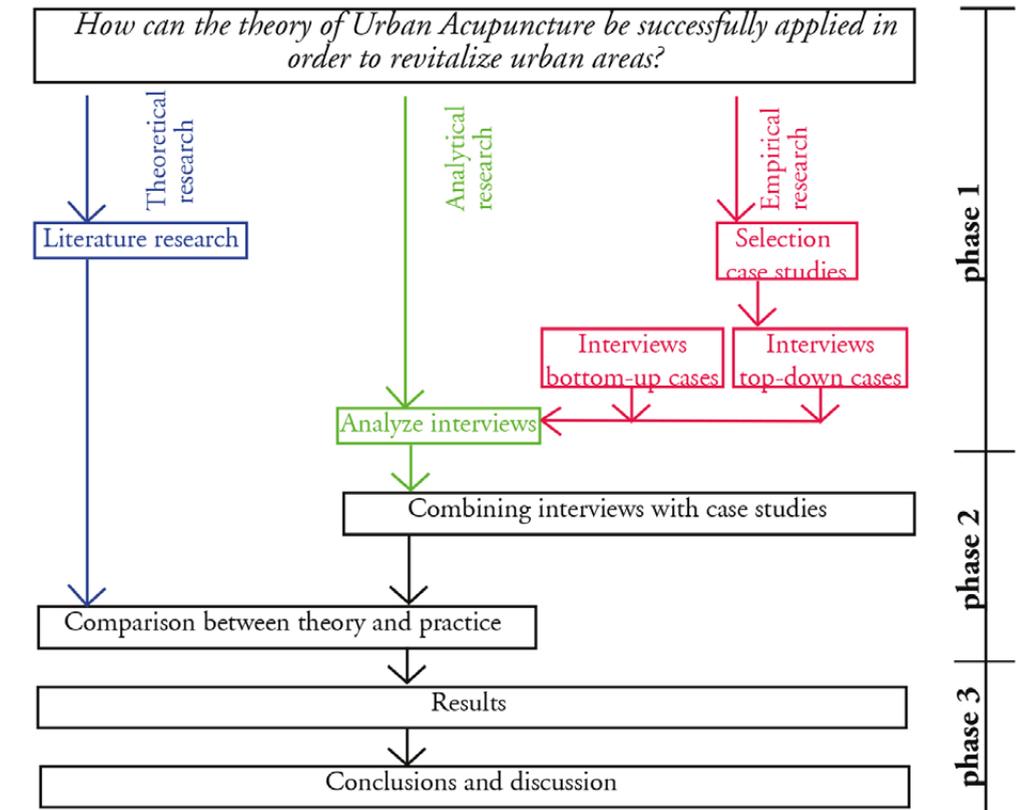
Fig. 66: Methodological structure of the urban acupuncture approach (source: Hoogduyn, 2014).

often derive from a lack of continuity in the fabric of the city. Urban acupuncture pursues this goal, but how can its design needles stimulate sensitive points, healing urban scars on the skin of the city?

The reference to the aforementioned principle of the quick act is fundamental because it promotes a combination of urban activities in the most damaged areas within the shortest possible time, increasing the socio-economic value. Again, in relation to the speed of execution and decision-making, it should be noted that sometimes acupuncture can lead to an unusual but productive non-intervention. It is not certain that a particular urbanistic or architectural work is necessarily positive towards the fabric on which it insists. The intervention could in fact risk altering or even erasing both physical and intangible elements of the collective memory and shared perception of a certain area.

Urban regeneration is also based on not purely architectural interventions but merely infrastructural ones that equally redistribute the benefits among all layers of the community: urban mobility can be considered a factor of distribution and supply of the territory, allowing everyone to enjoy in the same way the potential of the city.

Fig. 67: In Curitiba, citizens use particular tubes, designed by Lerner, to take bus. These elements integrate walkways for disabled people access(source: https://exploring-and-observing-cities.org/2013/04/04/curitiba-visions-of-a-better-city-creative-solutions-to-get-there/).

The importance of a concrete advancement of metropolitan usability is, therefore, evident. The whole city must become smart, in a broad sense, starting from its inhabitants: if it is true that people must be at the centre of the urban system, then it can be said that smart pedestrians are those who are allowed to move freely through the city (Lerner, 2014). With its needles, urban acupuncture can transform the city into a real smart city, locating the project activity on the entire road system and on all the means of transport that cross it, facilitating a socioeconomic elevation of the latter.

In summary, urban acupuncture efforts must incorporate the concept of *Urbanismo social* (Kapstein & Ramírez, 2016). This principle is applied through multiple educational and cultural programmes, in which each proposal for change is closely linked to adequate preparation of the citizens so that they actively contribute to the design process. Their participation clearly transpires from the dual nature that acupuncture interventions can take.

Fig. 68: The interior design of the bus-tubes in Curitiba(source: https://nextcity.org/daily/entry/healing-cities-urban-acupuncture-curitiba-mayor-jaime-lerner).

In cases such as the Jan Maijensquare, a historically degraded district of Amsterdam, the same inhabitants, with the support of the institutions, carried out in 2006 a multilevel redevelopment project of the area, focusing on aspects such as road safety and lighting rather than mere architecture: this was enough to restore the correct energy flow of the city. The area, whose main nucleus resides in a square, hosts a school, whose ground floor was abandoned and for this reason obscure and dismal, and a church, a potential social attractor. To combat rampant crime in a space without effective control, the religious building was fitted out for various social purposes, such as the screening of films; similarly, the abandoned classrooms of the school became public spaces for events. Together with a simple retrofit of the street lighting system, these interventions have made the site liveable again, giving it a precise identity. The bottom-up model was pursued: the community pursued an idea for a specific

Fig. 69: The regenerated Jan Maijensquare in Amsterdam. In the background, the Jeruzalem Church (source: Google Maps).

Fig. 70: Detail of the urban acupuncture for the Jan Maijensquare in Amsterdam (source: https://www.detuinvanjan.nl/fotos).

possible to expand the clientele, transforming the neighbourhood from a peripheral area to a new centrality, to the benefit of the local economy and the quality of life of the residents; road safety also benefited from the intervention, thanks to the greater flow of users that made the place less isolated and solitary. It is, therefore, the case of a top-down acupuncture operation: the central administration proposes solutions for a specific site, maintaining constant communication with the citizen in order to better understand human needs, thus protecting the intrinsic value of the area.

In summary, urban acupuncture, due to its characteristics of flexibility and rapid execution, seems to provide a valid support to the planning process and could concretely realise the potential of the urban and peri-urban territory, mediating the typical dimensional variations of urban planning and effectively connecting to a multiscale and multidisciplinary approach, offering the possibility to all social groups to join the regeneration project of the city, pursuing the most recent theoretical lines that aim to attribute an ever greater operational practicality to the methodological approach.

4.4 Tactical Urbanism

The second interesting practice of urban regeneration according to the bottom-up approach is the Tactical Urbanism. The term was inspired to Mike Lydon by a discussion about the pedestrianization of Times Square in New York in 2010. The word was applied also to many other interventions characterized by short-term and low-cost actions to regenerate public spaces. Despite the speed of action and the limited surface interested by transformation, these interventions were demonstrated to produce long-term change.

The Tactical Urbanism was described by some books, some of them available on web sites, such as Tactical Urbanism: short-term Action, Long Change, Volume 1 assembled in 2011 by Lydon, or Tactical Urbanism: short-term Action, Long Change, Volume 2 (2012) with the presentation of two dozen of different practices of such

area without an imposition from above.

In contrast, at Rosengård, a district in the heart of Malmö, the municipal authorities understood the need to revitalise the Bokalerna Bennets Bazaar shopping complex, an essential socio-economic element for the citizens of the neighbourhood. In 2009, with the help of the designer Kenji Mijazu, a localised urban project tried to give a new and stronger symbolic value to the complex, physically intervening on its facade and on its shops' ground floor, incorporating the pre-eminent multicultural aspect of the community. Furthermore, by making the commercial centre visually more intriguing, it was

City Agencies -
Mayor's Office -
BIDs -

Non-profits -
Entrepreuners -
Developers -

Local Activists -
Comunity Groups -
Artists -

Open Streets

Park(ing) Day   Pavement to Plazas

Intersection Repair   Pop-Up Shops
                                                         Play Streets
Bike Parking   Food Carts/Trucks
                                                      Street Fairs
Build a Better Block   Mobile Vendors
                                                  Pop-Up Cafes
Guerilla Gardening   Site Pre-Vitalization

Chairbombing   Temporary Retail

Ad Busting   Pop-Up Civic Forum

Tactics

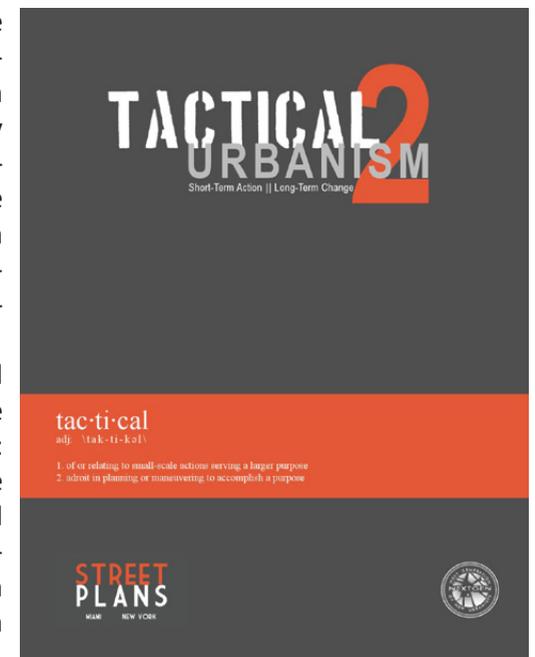**Unsanctioned   Hybrid   Sanctioned**

Fig. 74: Tactical Urbanism's tacticians and tactics, some of which are sanctioned (source: Lydon M., *Tactical Urbanism 2*, 2012).

kind.

The main aim of Tactical Urbanism is the improvement of the livability of towns at the street or block scale adopting an incremental implementation in opposition to the common large-scale interventions programmed by urban planning. The basis of the approach roots on the awareness of the difficulty to control the dynamic status of cities. The contemporary cities, more than the past, are in a constant state of change and the large-scale interventions require long time, many funds and social engagement. In addition to these difficulties the benefits to be gained through these interventions are not guaranteed. In the ordinary planning and implementation processes citizens are invited to be part of the design but very often they are not able to understand the entire proposals and the scale of transformation. These difficulties lead very often to a strong contrast with the planners and developers feeding feelings of NIMBYism refusing any kind of interventions.

The Tactical urbanism represents an alternative to this ordinary process lying on the capability to involve local citizens in the transformation of existing areas. The approach is not new in the history of cities and nowadays is referring to practices like "Guerrilla Urbanism", "pop-up urbanism", "city repair" or "D.I.Y. Urbanism". The main five characteristics of the Tactical Urbanism are (M. Lydon et al., 2012):

- A deliberate, phased approach to instigate change;
- An offering of local ideas for local planning;
- Short-term commitment and realistic expectations;
- Low risks, with a possibly a high reward;
- The development of social capital between citizens, and the building of organizational capacity between public/private institu-

tions, non-profit/NGOs, and their constituents.

The Tactical Urbanism, after ten years of experimentation has demonstrated to be effective in terms of incrementalism's benefits, in fact the tactical interventions create a laboratory for subsequent larger actions. The tactical actions are flexible and low cost, attract people and firms to the place creating interest for them and stimulating the investments. If the project works, in such a manner the municipalities can test the positive outcome and decide for the future of the area. For this reason, Tactical Urbanism is most effective when it is applied together with the ordinary urban planning aimed at the development of long-term interventions. The short-term interventions are able to involve citizens and mitigate contrasts between different interest groups and community leaders, resulting in a positive participatory process.

Moreover, the Tactical Urbanism was successfully applied to compact towns with an underutilized supply of walkable urban space. In fact, the large part of best practices commonly human-scaled places in existing towns.

The Tactical Urbanism was applied to a large spectrum of different places and in different practices, some of them sanctioned, others unsanctioned and also in hybrid situations, as shown in the fig. 74.

At the moment more than two dozen of tactis are described in the Lydon's books as listed below.

Open Streets have the purpose to provide safe spaces for walking, bicycling, skating and social activities raising awareness about the detrimental effects of cars on urban living. These initiatives are often referred to the Spanish word "ciclovía" and to the example develo-

Fig. 75: Since 2012, Montreal has closed Saint Catherine Street to traffic animating the pedestrian zone with overhanging pink resin balls. This is an *Open Streets* intervention (source: By Eric Sehr - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=36326942).

Fig. 76: Example of Play Streets in Minnesota (source: https://streets. mn/2013/06/19/ tactical-urbanism-builds-better-blocks-and-streets/ img_20130608 _184324 _324/).

ped in Bogotá but many other interventions are spread in the world. The Open Streets produce benefits not only for safe walking and bicycling but they support social interaction in public spaces.

Play Streets initiatives promote safe spaces for people of all ages to be social and active, providing parks and open spaces for recreation and community interaction. They are very popular in London and New York where people claim spaces for recreational activities. Usually they are developed in private area used for car parking and are transformed in playgrounds. In New York City, a "play street" can be created when the 51% of the residents living in one-way residential block sign a petition asking the transformation and the project is approved by the Community Board.

Build a better block has the purpose to promote livable streets and neighbourhood vitality. The project was launched the first time by local activists in Dallas. The initiative supports local people and

Fig. 77: Park(ing) day experience in Portland (source: https:// heystamford. com/2015/09 /09/11-creative-temporary-parklets- coming-to-stamford-downtown-for-parking -day/).

property owners to temporarily activate vacant storefronts and public space. Doing so, it has a spin-off effect producing a permanent use of underutilized retail space.

Pop-up retail is similar to the previous tactic, promoting temporary use of vacant retail space or lots. It is often developed through a one-day event.

Park(ing) Day is an annual event where on street parking space is converted into park public space. The initiative encourages local citizens to collaborate and improve public realm.

Guerilla Gardening initiative started since 1973 in New York and now has became an international movement. It consists in the act of gardening on public or private land, usually vacant or underutilized, without permission. This tactic is very powerful and useful suppor-

Fig. 78: On the left, guerrilla gardening in Taranto, Italy (source: https://www. grottaglieinrete. it/it/guerrilla-gardening-a-taranto-per-dipingere-di-verde-il-grigio-della-citta/).

ting the improvement of an urban neighbourhood and promoting different uses of land: sustainable food system, urban stormwater management, promoting collaborative and short-term local action.

Pavement to plazas reclaims underutilized asphalt areas as public space with low-cost intervention. The first pilot project was developed in Times Square in New York City with the "Greenlight for Midtown" initiative when the square was closed and transformed in a pedestrian area where people have the opportunity to sit and dialogue each other.

Similar to the previous one is *Pavement to Parks* initiative where people can change underutilized asphalt areas in green public space. It was first carried out in San Francisco after the best practice of New

Fig. 79: On the right, another example of guerrilla gardening in London (source: https://www. spatialagency.net/ database/guerrilla. gardening).

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Pop-up Cafes is similar to the pavement to plaza program, promoting outdoor public seating in the parking lane and local businesses. The private initiative is fundamental because the businesses should sponsor the action and then the City' s Department of Transportation provides technical assistance.

Depave is an interesting initiative aiming at reducing storm water pollution together with the increment of land available for habitat restoration, urban farming, tree planting, native vegetation, and social gathering. The core of the action is represented by the removing of unnecessary asphalt pavement in urban areas. The program depave began in 2007 as self-organized neighbourhood effort and became in the subsequent years a non-profit organization that received grants from U.S. EPA (Environmental Protection Agency). Depave represents a best example of how initial unsanctioned action can become sanctioned in a short amount of time.

Chair Bombing consists in a simple increase of supply of public seating in public spaces aiming at improving the social well-being of local community by re-use of waste materials.

Food Carts/Trucks are not new in the history of mankind and it is well recognizable that the street food vending activity attracts peo-

Fig. 81: Depave process example (source: https://content.yardmap.org/learn/what-is-and-how-to-depave/).

ple in public space and supports human interaction. In many cities this kind of activities is supported because it stimulates the vitality in public realm.

Site Pre-Vitalization is the temporary re-activation of an abandoned land. This initiative brings a variety of activities such as art, food, and retail. Many examples are represented by public markets, art exhibitions and studios, community festivals, beer gardens, micro-retail opportunities, flea market and so on. All the temporary activities are able to involve people and, above all, the owners/developers showing the potentials of the site.

Pop-up Town Hall provides a temporary forum for public discussions of civic importance. It is applied in places where a civic discus-

Fig. 82: Pavement to Parks in San Francisco, before and after (source: https://global designingcities.org/publication /global-street-design-guide/streets/pedestrian-priority-spaces/parklets/case-study-pavement-to-parks -san-francisco-usa/).

Fig. 83: Chair bombing in Greater Victoria, Canada (source: https://victoria placemaking.ca/2015/placemaking/chair-bombings-rock-victoria/).

sion is occurring and it can be located in underutilized city spaces or other sites.

Informal Bike Parking responds to the informal demand od bicycle parking in cities. The lack of parking areas is stimulating activists and land owners to install various types of temporary and semi-permanent solutions.

Intersection Repair is a very creative initiative based on the use of street intersection as community space. Citizens paint the intersection communicating to the car drivers that they are entering a place of neighbourhood importance. Moreover, the constant activity of

maintenance of the site has the most importance because enabled the residents to take care of the near places installing benches or art objects.

Ad-Busting was carried on in San Paulo, the largest city of Brazil, to reduce the visual pollution of advertising in public realm. The main goal is to improve the aesthetic quality of cities, also giving the message that the public realm should not be used mainly for consumption of commercial products.

Reclaimed Setbacks is an action applied to US residential neighbourhoods where the space between the houses/buildings and the streets (typically the sidewalks) are underutilized. In front of the houses typically we don't have activities, relegated to the private courtyards, developing a feeling of unsafety for pedestrians. The initiative aims at improving the vitality of streets attracting social acti-

vities.

Parkmobile is another creative initiative carried on in San Francisco in 2011. The parkmobile was designed by a Landscape Architect and consists of a fitting of a single vehicular parking space. It provides a temporary and mobile green space giving response to residents' desire of green areas in neighbourhoods.

Weed Bombing is a protest action against the degradation of neighbourhoods' spaces where weed spreads off. It uses the street art to convert overgrown weed in painted coloured places. While the street art and graffities sometimes damage the private property, weed bombing not and, moreover, attracts attention on the problem of lack of maintenance.

Fig. 87: Biscayne Parkway transformed one of its parking lots into a park with a Parking Making intervention (source: Lydon M., *Tactical Urbanism 2*, 2015).

Mobile Vendors are a traditional figure in urban realm. It is well known the small-scale street vendors attract people and create vitality in public space. As consequence, urban spaces should be regulated by simple rules to better organize these useful activities in the streets.

Micro-mixing is based on the sharing of single retail space from different commercial activities. It supports minor entrepreneurial activities of shop owners who can share costs associated with opening a new venture. Micro-mixing is a smart economic strategy that helps small businesses grow incrementally.

Park Making is a similar action to park(ing) but, despite the latter, was applied to larger car parking areas. In many cities large underutilized car parkings were converted in public parks or other sites of public use.

Finally, the *Camps* represent another example of protest initiative because it consists in a temporary occupation of space, attracting attention on a part of the city for many different reasons. The occupation of public space, such as green park, for different reasons can focus attention and action from institutional bodies or private stakeholders.

The listed initiatives, all of them defined as urban tactics, show the potential of the temporary or short-term actions able to change uses in public space. Some of them can become permanent and work well in time, in other cases they have the merit of attracting attention on disused, underutilized, degraded or unsafety places in cities improving social awareness on the potentials of change of urban fabric. Moreover, they involve economic stakeholders and support little changes in the urban economic structure.

CHAPTER V
URBAN Safety

V. urban Safety

Keywords: *safety, security, perception, risk, cpted, defensible space, urban safety plan*

5.1 Risk and Safety

Postmodern culture has revealed the need for multiple knowledge in order to understand the particular nature of the social problems that arise from the high level of complexity of reality. Alongside this, it also emerges the inadequacy of the traditional scientific approach based on a deterministic rationality which, having entered a crisis, is leaving more and more room for uncertainty and the response to this must be formulated through the more prudent application of a 'Multivocal rationality' (Acierno, 2003).

Fig. 88: Summary of the characteristics of the risks.

RISKS AND TOOLS OF THE TERRITORIAL GOVERNANCE	
RISKS CLASSIFICATION	SOME GOVERNMENT TOOLS
NATURAL DISASTER RISKS a) unpredictable natural catastrophic events earthquakes, volcanic eruptions, tornadoes, etc. b) partially predictable natural catastrophic events avalanches, floods, landslides, fires, etc.	Civil Protection Plans, Seismic Recovery Plans, Building Regulations, Territorial Insurance Indemnities, Basin Plans, Landscape Plans, Urban Plans, etc.
NATURAL DISASTER RISKS c) major accident risks earthquakes, volcanic eruptions, tornadoes, etc. d) widespread ecological risks radioactivity, acid rain, ozone hole, toxic substances in air, soil, water, food, electrosmog, etc. e) risks and accidents on transport	Environmental impact assessment, Strategic environmental assessment, Regulations on polluting emissions, Participation processes (Agenda 21), Information campaigns, etc. Traffic plans, GPS systems, etc.
SOCIAL RISKS f) risks from crime and environmental unsafety	Security Contract, Adoption of the neighborhood policeman, Social policies, Police policies, Environmental approach to security, etc.

The risks that can affect human life are manifold and concern all aspects of being, from material aspects to those concerning the

emotional and spiritual sphere. The risks of interest to urban planning, of course, are those that can in some way affect the shape and use of the territory, generally classified as: natural disaster risks (earthquakes, volcanic eruptions, bradyseism, tornadoes, cyclones, etc.); technological environmental risks (explosions, fires, radioactivity, acid rain, ozone hole, electrosmog, etc.); social risks (crime, degraded physical spaces, neighbourhoods with high percentages of poverty, etc.) (see fig. 88).

The concepts of risk and urban security, mutually antithetical elements, are not univocally identifiable but, on the contrary, constitute a political issue often linked to conflict and social justice's problems. The planning of the 'safe city', therefore, becomes a complex operation, which cannot be accomplished with the mere application of professional knowledge but by also activating political processes of participation and cooperation. 'Integral security' does not actually exist and it would be better to define it as 'acceptable risk' because each company, community and government body establishes the levels of risk they are willing to tolerate and will intervene to pursue them, with the economic costs and the reduction of freedom that they entail.

Security policies intervene on the physical-functional space of the city mainly when the so-called situational prevention policies are implemented, that are those aimed at reducing the occurrence of space crimes, and we refer to the widespread practice of municipal ordinances against the behaviours considered at risk or unwanted (prostitution, car window cleaner, etc.), or to formal surveillance strategies, with the best organisation and collaboration between local police and other law enforcement agencies, to the installation of CCTV systems, to the improvement of street lighting, dissuasive street furniture up to the most recent residents' control of neighbourhoods (borrowed from the experiences of British neighbourhood watching); these ele-

Fig. 89: Effects of unsafety in urban areas, like fortified spaces, public video surveillance, mass media influence, weak and unwanted subjects.

ments are added to the social prevention policies, which consider urban redevelopment one of the privileged tools of social rehabilitation, cultural growth and living conditions of the communities in the most risky neighbourhoods.

5.2 Safety and urban planning/ design research in the twentieth century

It is above all in the latter times that the theme of 'settlement quality', the quality of the urban environment and in essence the quality of life, focusing on urban planning strategies aimed at 'reassurance' of urban users, is placed at the centre of administrative attention but also at the core of technical debate.

The most urgent issues related to city security are the weakening of urban centralities, the poor visibility of the most marginal and peripheral areas as well as the increase in social segregation and functional specialisation, which often affect these areas and, most importantly, the spread of degradation and the difficulty of ensuring constant maintenance of the public space.

It is true that in the urban planning policies of the past twenty years particular attention has been paid to these needs by giving the proper infrastructures to many of the peripheral and popular residential neighbourhoods of the cities: anyway, immediately afterwards, it has often been noticed scarce use or even abandonment of public spaces/equipment by the local population, demonstrating the difficulty of triggering also the indispensable virtuous processes
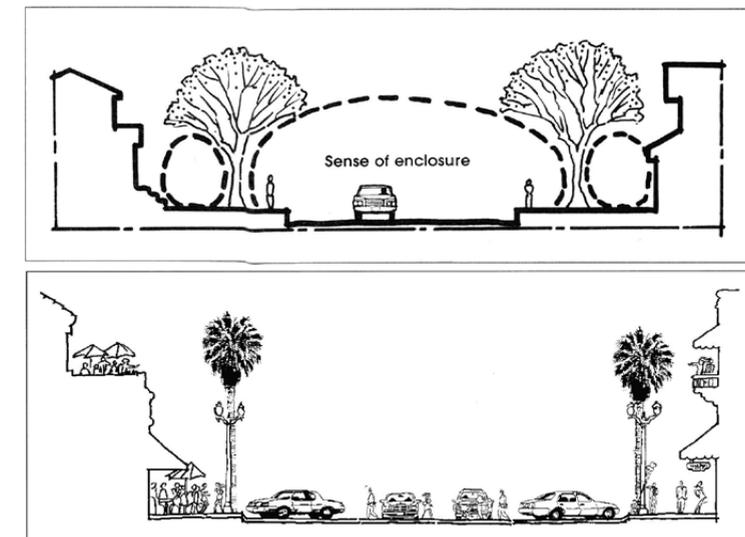

Fig. 90: Sketches by Robert Kirkner to describe that design of the built environment should respect human scale and that communities should include places encouraging social interactions.

Fig. 91: The Chicago School urban scheme modified by Davis according to fear.

17 The proposed iea is to analyze the public spaces working well and not starting from the degraded urban areas.

18 Park R., Burgess E. and McKenzie R. in the volume *The City* (1938) present the ecological theory of crime, which attributes the responsibility for deviant behaviour to the social environment, hence the need to intervene on the latter to prevent deviant behaviour and direct the new generations towards positive behaviours and models. On youth crime in Chicago see also Show R., Clifford R., McKay L., Henry D. (1969), *Juvenile Delinquency and Urban Areas*, Chicago, The University of Chicago Press.

19 J. Jacobs, (1969), *The Death and Life of the American City*, New York.
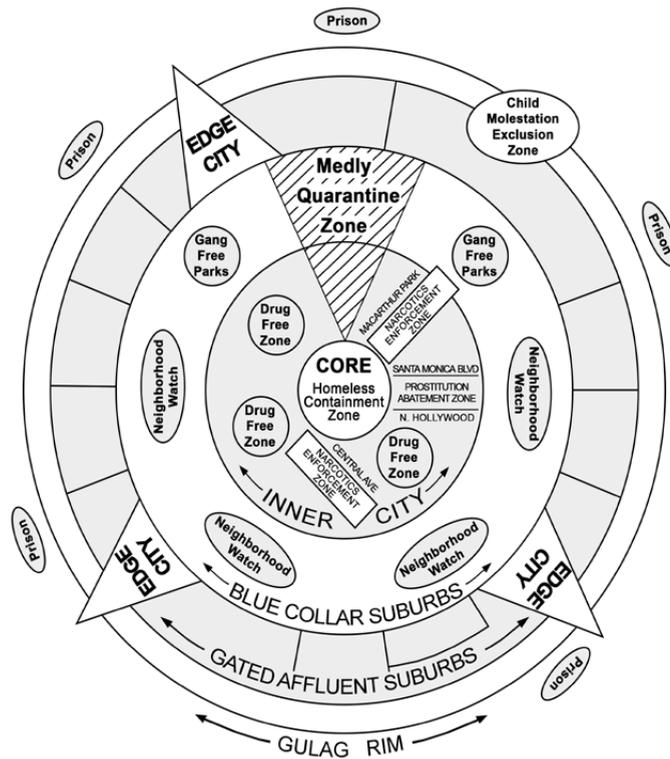
of appropriation of space and construction of new symbolic and identity values, in the urban physical redevelopment interventions.

In response to these inefficiencies, the need for correct integration of new public spaces and equipment has been proposed by many parties, through a conscious and participatory choice of locations, their maintenance and continuous improvement, avoiding their appropriation by only some dominant social groups, denying access and attendance to other groups.

To curb the security crisis and the privatisation of the urban public space, a line in full countertrend is proposed: a more widespread design and construction of public spaces with intrinsic qualities that guarantee their *self-protection*.

Analytically, it is proposed to start from a 'positive' point of view,[17] not studying problematic public spaces but those ones that favour social exchange, attendance and diversity, with the aim of identifying some common elements that can be adopted effectively in the redevelopment strategies. We refer mainly to the public spaces *par excellence*, the squares and parks, but also to those that reproduce the same characteristics on a smaller scale, such as small open spaces, forecourts and gardens, that is the minute interstitial network that constitutes the urban connective tissue, usually pedestrian.

The line of research is, therefore, oriented towards understanding the characteristics of the 'welcoming public space' in order to design new ones or to regenerate, manage and preserve/improve existing ones.

The relationship between form and use of public space in the contemporary city in relation to the emergence of fears in its users, especially in reference to possible criminal acts of which they could be the victim, has been widely investigated in the last century, starting from the Chicago School[18] in the 1930s. The *Community Crime Prevention* model actively involves the local community: in socially degraded neighbourhoods, the community thus faces internal problems (social unease, deviance, petty crime, etc.), mobilising with appropriate actions of youth and professional training, assistance of the weaker groups and consolidation of social systems, while, in the wealthiest neighbourhoods, the community plans strategies to defend themselves against crime from outside.

In the 1960s, Jane Jacobs[19] compared consolidated centres with the new neighbourhoods of 'orthodox' urban planning, as well as defining residential neighbourhoods built according to principles of both modern rationalism and to the ideals of the typical Anglo-Saxon 'extended city', with its model of single-family house widespread in the territory, guilty of disrupting the community network of interpersonal relationships and the life that developed on the 'sidewalks', the public place *par excellence* where the inhabitants themselves could informally exercise vigilance on the spaces of the neighbourhood. Ja-
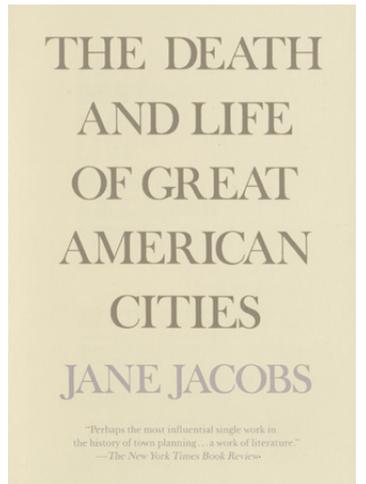

Fig. 92: Jacobs J., *Death and life of great American cities*, 1961

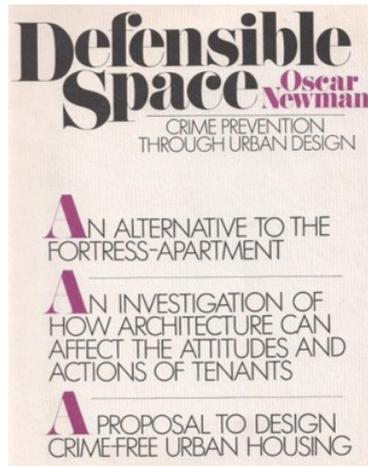Fig. 93: A *safety walk* during Jacobs' Walk event in Tel Aviv, 2013 (source: By Tamar Zandberg - Jane's Walk, Public Domain, https://commons. wikimedia.org/w/ index.php?curid= 26215928

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Fig. 94: On the left, Newman O., Defensible Space, 1972. On the right, CPTED principles by Jeffrey.

20 Newman O. (1972), *Defensible Space. Crime prevention through urban design*, Mc Millan, New York and (1996) *Creating Defensible Space*, U.S. Department of Housing and Urban Planning.

21 Jeffrey C.R. (1971), *Crime prevention through environmental design*, Sage, Beverly Hills.

22 Today there are numerous associations of designers, administrators and operators interested in urban planning applied to crime prevention who recognise
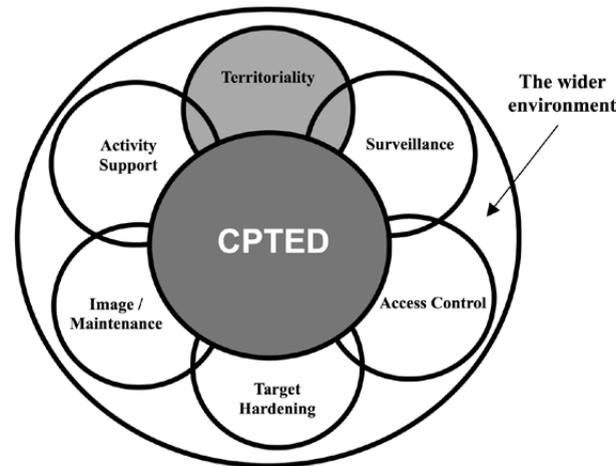
cobs completely subverts the basic principles underlying modernist urbanism, namely that autonomous neighbourhoods and large empty spaces guarantee greater tranquillity and safety, demonstrating on the contrary that it is precisely the peripheral areas, wide parks and spaces occupied by infrastructure that are less controlled favouring criminal and uncivilised acts.

Oscar Newman, creator of the *Defensible Space* concept,[20] will subsequently put Jacobs' reflections into practice with extensive research on the suburban neighbourhoods of New York and inferring some design rules relating to building typologies, organisation of open spaces (classified in public, semi-public, semi-private and private spaces) and involvement of local communities in consolidating the sense of 'territoriality'. In 1971 the criminologist C.R. Jeffrey[21] coined the expression *Crime Prevention Through Environmental Design*, which was widely successful and still today indicates the fundamental approach to crime prevention according to urban and architectural methods, although the content of his studies had a completely different nature. For Jeffrey, the environmental approach meant a strong interaction between man and nature, mediated by the capabilities of the human brain: it is clear how important the urban environment is, including its physical aspect, because it can modify its users' behaviour. The innovative path proposed by the criminologist was to re-educate criminals and train the younger generations and it was based on building a suitable environment for developing positive attitudes and behaviours towards neighbours.

Newman's theories and experiments will start the trend of the so-called *Cpted*[22] and later in Europe of the *Doc*[23] (*Design Out Crime*), whose main principles are the natural control of access, natural surveillance, territoriality and maintenance and continuous use of

space. These techniques will quickly catch on in the USA and in the Anglo-Saxon countries for the simplicity of the principles and the visibility of the effects, concerning the organisation and maintenance of the space, which represented a suitable tool for real estate marketing.

Alice Coleman's research[24] merged in the 1980s, based on the analysis of thousands of buildings located in the London suburbs and aimed at demonstrating the relationship between urban design and deviant behaviour, trying to provide some rules of good design for urban safety. In the same period, Clarke[25] supported the *rational offender* theory according to which criminal behaviour is the result of a rational decision-making process that evaluates between the various variables at stake including the shape of public space, which can also induce the renunciation to commit the crime if the ideal escape conditions are absent, raising the risk of being identified or captured. Kelling and Coles' best-known 'broken window theory'[26] of the early 1990s focuses on the maintenance of physical space, a sign of the presence and care of inhabitants as well as institutions capable of deterring the presence of criminals and especially to curb otherwise a rapid process of physical and social decline of residential neighbourhoods.

Furthermore, from the mid-1990s until the mid-2000s, the European debate saw the attempt to translate the reflections and practices experimented into standardised legislation, which was taken up by the Technical Commission 325 (TC 325) of the European standardisation body, analysing the previous European and North American research and building a shared methodology of approach to urban security. The result of the work of more than ten years of meetings and revisions of legal texts is a sort of manual, codified in CEN ENV 14383-219[27] which tries to define common guidelines in order to address the distinct safety problems in different territorial contexts. The standard was approved in its final version in 2006 and in Italy it is included in the UNI standards.

The standard consists of a process of actions rather than rigid prescriptive rules and must be built with the participation of citizens, administrators, representatives of the local police, designers and all subjects involved in any way in the search for specific solutions to particular problems that occur in certain contexts. It has the merit of providing flexible guidance and does not appear rigid, as a standard might be, however, it seems adequate to deal with limited and detailed problems although it cannot give answers to structural problems.

The standard aims to simplify the development of strategies and

23 Design Out Crime was born in Europe in the 1990s, inspired by the US Cpted but with the precise intent to adapt to the European city and, therefore, with some distinctions compared to the original model. See the website www.e-doca.net.

24 Coleman A. (1985), *Utopia on trial: vision and reality in planned housing*, Hilary Shipman, London.

25 Clarke R. (1982), *Situational Crime prevention: Successful case studies*, New York, NY: Harrow and Heston. Clarke's theories are the fulfilment of studies begun already in the mid-1970s by Patricia and Paul Brantingham on the behaviour of pickpockets in residential neighbourhoods (see Brantingham PJ and PL (1975), *Residential burglary and urban form*, in Urban Studies, 12 (3), October) followed by a series of other research published up to the 1990s. We especially remember the *Environmental*

Criminology volume (1981) which represents the central theory of the two Canadian academics.

26 Kelling G., Coles C. (1996), *Fixing broken windows: restoring order and reducing crime in our communities*, The Free Press, New York.

27 CEN is the Comiteé Européen de Normalization which is concerned with the drafting of standards whose adoption remains voluntary and has no legislative prescription force, however European countries can introduce their use and make it mandatory in national laws. See the website http://www.cen.eu

28 The corresponding websites are indicated below: www.cabespace.org.uk; www.spaceforpublic.org; www.pps.org

Fig. 95: Section of the territorial layer, from street to residence, highlighting public and private space (source: City of Vancouver Planning Department).

measures to reduce the problem of crime, providing theoretical and practical support on how to follow an efficient application strategy. Even if it is considered as 'the only Crime Prevention Standard in Europe since the Roman Empire' (Davey, van Soomeren, Wootton, 2014), it is possible to find some critical issues in its real application. In fact, its process part proposes a 7-steps model which should define a universally applicable system: in any case, the dissemination of the standard appears to be its weak point. Although it is available in any European and world standardisation institute, it still has a high realisation cost and it is not adequately promoted by the competent bodies. For this reason, the COST Action TU1203 of 2014 proposes a better dissemination of the standard, updating the process with recent developments in the field of sustainability and risk management, in order to merge ideas and practices in a new and more adequate urban safety theory.

In recent years there has been a new line of research that has reopened the discussion on public spaces and their improvement, especially in the Anglo-Saxon world with the interest of the British government in the production of a better public space, supporting the CABE (Commission for Architecture in the Built Environment), and the professional work of the Urban Design Group. In the USA, however, the renaissance of public space studies finds a reference point in the *New York Based Project for Public Space*, and in Europe in the *European Centre on Public Space* and in the intense editorial activity of specialised magazines on urban design.[28]

Many of these activities have resulted in the publication of manuals and guides for the good design of public spaces, with the limit still present to represent mainly the point of view of the professionals of the physical environment (architects, urban planners, engineers, etc.) and less the desires of ordinary people who actually use those spaces.

In fact, there is not much research on what citizens consider a public space and how they would like to use it, nor on their perception
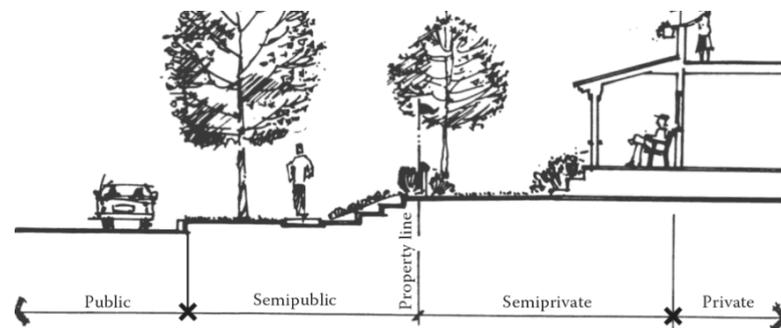
and the optimal level of comfort.

5.3 Public space and urban safety design

The contemporary city, grown out of all proportion, invading the surrounding territory, is now a puzzle of disjointed and inhomogeneous pieces, subtracting agricultural land and producing interstitial spaces that theoretically become 'spaces for potential public use', but which concretely can no longer be managed and ends up becoming a concentration of waste and isolation, and often even falls into the grey area of unorthodox or illegal uses. These conditions do not belong only to the industrial and post-industrial urban heritage, but also to the most recent urban expansion interventions of many cities whose design principles often determine undesirable effects or unmanageable residual spaces. In the Anglo-Saxon culture the latter have been defined, with the original synthesis that distinguishes it, SLOAP (*space left over after planning*), that is the spaces left without a clear functional identity after planning, underlining the widespread responsibility of the same professional and managerial planning practice in producing ambiguous spaces with a weak intended use, which lend themselves to being easily transformed into places without a precise identity.

In a society like the current one that is mainly oriented towards profit and consumption, the public space where people can simply meet and talk no longer matters because it represents a scarcely productive 'object' and, therefore, not much attention is paid to it from entrepreneurs and decision makers themselves. Not surprisingly, it can be seen that most of the requests for urban transformation are oriented towards the production of large commercial containers, alongside which collective use is sometimes forced, only because they are required by agreements with the local administration, in any case representing a residual part of the urban territory.

The space of big shopping malls forms a part of the growing privatised and controlled space of contemporary cities which is added to that of gated communities, an answer to the uncontrolled explosion of fear and urban insecurity.

The public space is composed of a variety of places that are also very different from each other: from the traditional and public ones *par excellence* such as squares and parks, as well as the same
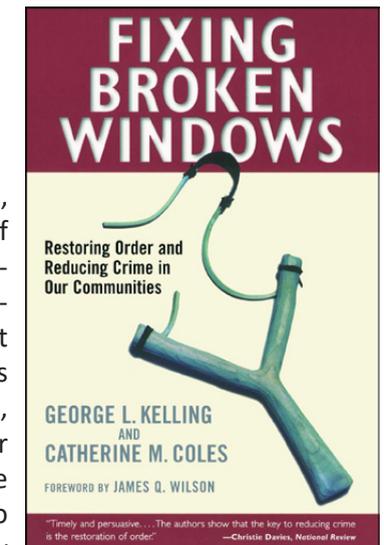

Fig. 96: Coles C. L. & Kelling G. M., *Fixing Broken Windows*, 1998
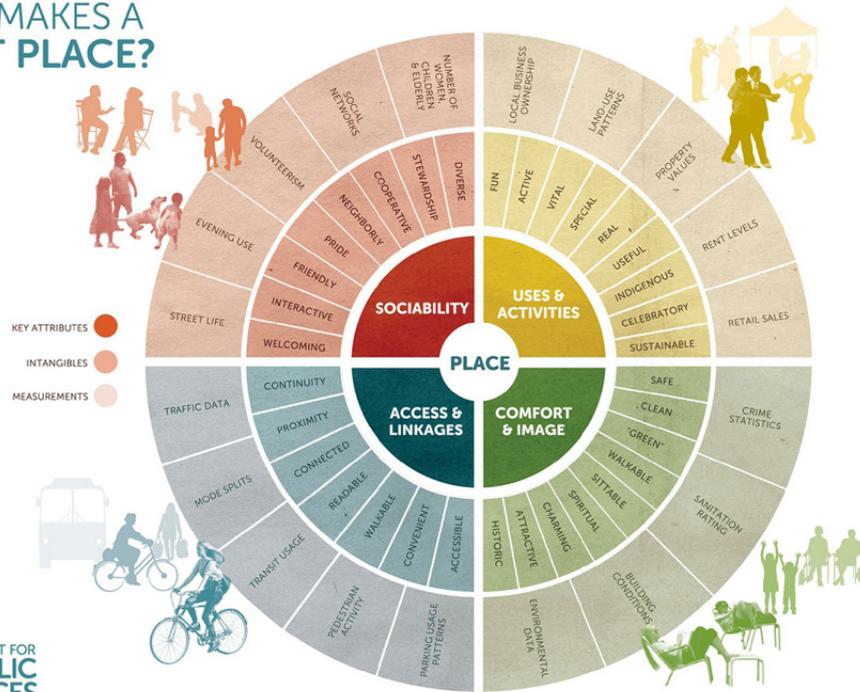
WHAT MAKES A GREAT PLACE?

KEY ATTRIBUTES

INTANGIBLES

MEASUREMENTS

Fig. 97: Description of a great place in the New York-based Project for Public Spaces (source: https://www.pps.org/).

29 Interesting and innovative research exists on the relationship between the social composition of the new residential neighbourhoods and the types of interpersonal contacts. For example, for the city of Madrid, the research team of Prof. J. Fariña of the Polytechnic University of Madrid has analysed the new

walkways when sufficiently large, to the reduced versions of these, that is, forecourts or small gardens. In addition, there are other mobility areas, mainly in large cities, where users can spend a good part of the day, such as railway and subway stations, airports and ports (service spaces of large transport facilities).

Reflecting on the now common and widespread behaviour, it is also possible to draw a map of the public spaces actually frequented by the majority of the population, which are reduced to the spaces near homes, to those in relation with the urban mobility network, to shopping centres located generally in isolated peripheral areas and to the city centre, generally the historical area that still has representative, commercial and tourist functions.

Instead, most of the interstitial and marginal space of the city still remains, from the peripheral popular neighbourhoods (generally considered places at risk that very often lack functional equipment and urban centrality that can attract people from other parts of the city), to the areas in transformation, to areas in the surroundings of large infrastructures and uncultivated residual areas: these are signs of a productive past now emptied of meaning, which end up losing any function, pending a possible transformation.

The inadequacy of the primary and secondary infrastructure of

many neighbourhoods and the lack of a retail and artisan commercial network often make public spaces deserted and inhospitable, feeding fears not only for occasional users, who already have no strong motivation to attend them, but also in the residents themselves.

The low attendance, together with the reduction of the feeling of territoriality and the sense of belonging until the loss of identity, can gradually generate vicious circles of physical and social degradation that also leave the field open to the radicalisation of crime. In this sense there is now a large literature on the subject, developed on the model of the aforementioned broken windows theory.

The prevailing response to the growth of fear is the privatisation of the space that produces greater social segregation within single-class residential neighbourhoods,[29] where man's primary need to socialise with his fellow human beings gradually decreases in the attendance of individuals similar in wealth, culture and ethnicity.

Therefore, the real public spaces, which we need and which have always accompanied the history of human civilisation, for whom are they made and why do they exist?

In public spaces, society explores and searches for new experiences and opportunities for social exchange and evolution. Urban sociological and urbanistic thinking have repeatedly stressed that a functioning public space is a necessary condition for the development of democracy and civilisation[30] (Mumford, Sennett).

In sum, public space is fundamental for physical health and well-being, learning, conflict resolution, tolerance, solidarity and economy.

Public spaces, such as parks, equipped areas and squares, unquestionably offer citizens a place where they can breathe clean air and where they can exercise their body, especially for sedentary lifestyles and for the accumulation of stress that current working rhythms induce. Numerous medical studies have shown how public spaces can promote not only physical but also mental well-being. Therefore, investments in the transformation of cities should also consider the general benefits that the population can derive from urban regeneration, not only those linked

neighbourhoods built in the last fifteen years in the metropolitan area, showing how most of the social contacts take place almost exclusively (more than 70%) between subjects belonging to the same social class. See J. Fariña, *Fragmented urbanizations: some reflections on the community of Madrid*, in Acierno A., Mazza A. (2008), *City in transformation. The urban explosion of Madrid*, Aracne Ed., Rome.

30 Mumford L., (1964), *The Highway and the City*, Secker & Warburg, London; Sennett R., (1973), *The Uses of Disorder: Personal identity and city life*, Penguin, Harmondsworth.
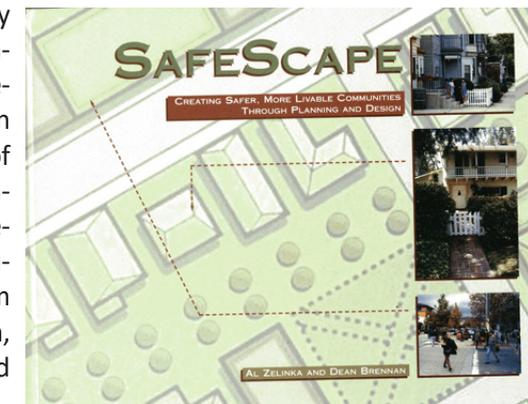

Fig. 98: Zelinka A. & Brennan D., *Safescape: Creating safer, more livable communities through planning and design*, 2001

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Fig. 99: Safescape main ideals (source: Zelinka & Brennan, 2001).

Fig. 100: Basic terminology for the field of urban safety research (source: Zelinka & Brennan, 2001).

31 In this regard, the *movida* phenomenon affecting some Italian city centres in recent years represents an amplified use of public space in the evening and at night. If we refer to the Spanish culture from which the same term is derived, it is possible to better understand the advantages and benefits of behaviours that prefer life on the street and the usual meeting in public places. Street life in the European regions bordering the Mediterranean is often taken as a positive model for the purpose of pleasantness of public spaces.

32 Cfr. Shaftoe H. (2008), chap. 1-2.

to the consumption of many and the profit of few people.

The public space offers an arena where citizens can meet similar social groups with whom they share similar behaviours, but also where it is possible to learn to manage conflicts with those who practise different lifestyles (think of the recent flows of immigrants). The simplest answer to conflicts is to entrench within the single-class boundaries of neighbourhood of belonging (gated communities represent one extreme example of this attitude) or of limited-access work environments, but the only alternative to this social drift is socialisation in public space also with ad hoc planned initiatives (events, festivals, etc.), from which solidarity can also mature over time.

Even from an economic point of view, the improvement of the conditions of liveability of the public space can produce advantages, more directly for the tourist use as a consequence of the enhanced attractiveness of the urban space but also for the commercial and refreshment activities that can derive from it.[31]

Furthermore, the use of public space is also directly linked to the security of places, through informal surveillance, as Jane Jacobs pointed out more than thirty years ago. The attendance and vitality of the public space, while offering in some cases a greater number of potential victims for some types of crime (pickpocketing, bag snatching, robbery), undoubtedly return a widespread perception of safety to users much more than in isolated and abandoned places.

The New Urbanists, Urban Villagers and supporters of the 24-Hour City[32] base their action on the implementation of strategies for frequenting the public space in order to instil perceived safety in users and produce in the medium term also a reduction of spatial crimes, as a result of natural surveillance and virtuous circles of integration and conflict mediation that can arise.

Two orientations are outlined in the interventions aimed at urban security: on the one hand, the design of welcoming public spaces capable of promoting integration and, on the other, from a totally opposite point of view, the implementation of surveillance strategies of the territory for *exclusionary* public spaces.

The first rule for effective urban protection is the recognition of the importance of the context in which we find ourselves operating, in geographical, socioeconomic and cultural terms. These components and the gradual history of an urban site make it possible to understand the best way to intervene, avoiding the adoption of universal techniques and solutions often imported from different countries and cultures.

The design of a welcoming and protected public space must also support the *mixité* of uses and users against modernist zoning, in order to make the space livelier and more popular at all times of the day. Spaces must be designed with clarity, readability and multisensory perception as their objective. The public space is generally perceived as at about one metre and seventy centimetres from the ground, along views obstructed by cars, signs, redundant and often

Fig. 101: A livable city is designed in respect of liveliness, health, attractiveness, sustainability and safety (source: Gehl Architects, *Seattle Public Spaces & Public Life*, 2009).
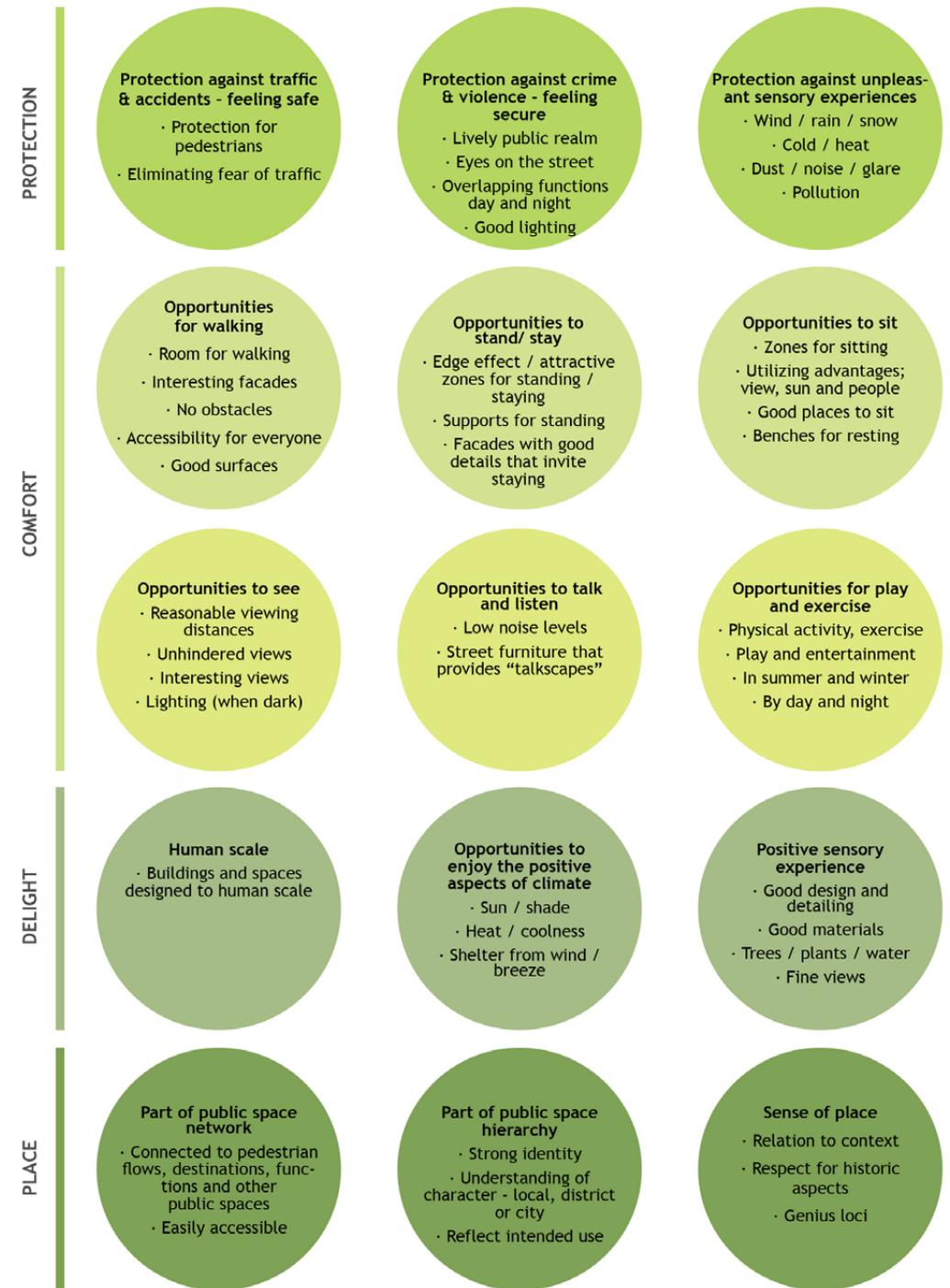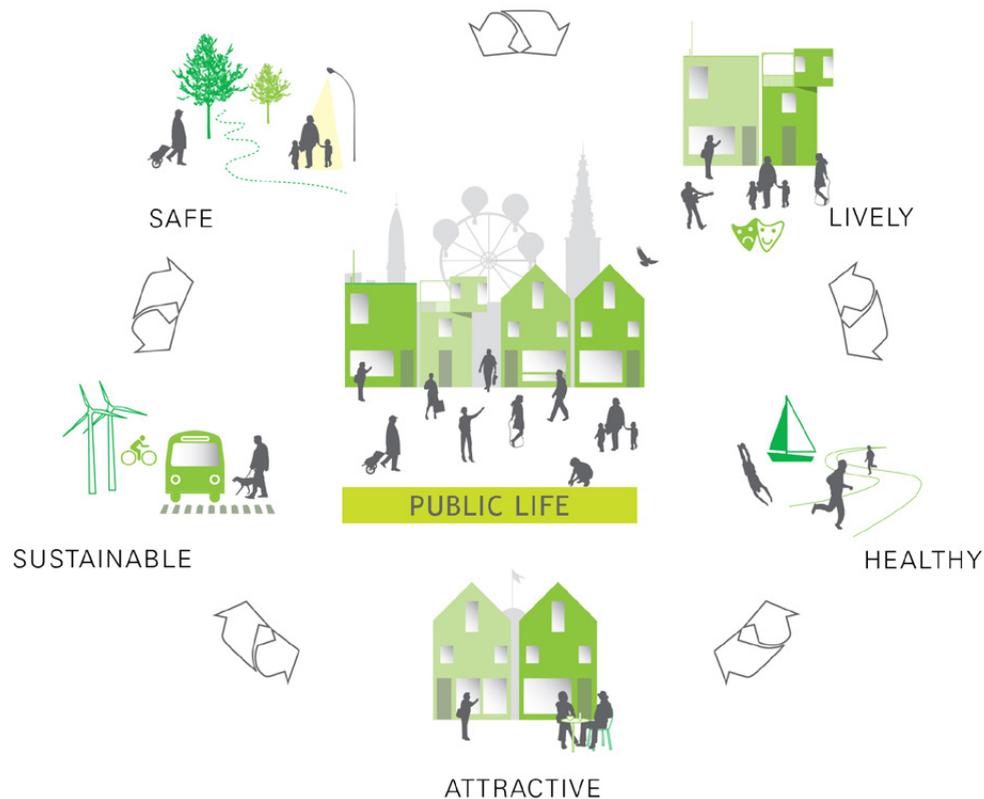
Fig. 102: Quality criteria for the urban project of Seattle (source: Gehl Architects, *Seattle Public Spaces & Public Life*, 2009).

Actions	Monitoring defects	Consequent critical issues
Identification of key indicators	Indicators are not identified but qualitative elements that cannot be measured and quantified. They are not clear and simple for stakeholders. Attention is needed progressive, constant and systematic.	Impossibility to account with the 'dictatorship of the figures', even if the indicators are detected, the stakeholders do not understand them. The list is too limited
Performance monitoring	Monitoring is not assigned to a person Frequencies are not suitable	In fact, no one carries out monitoring. Doing it late means incurring costs without getting results
Lack of Interrelationships between stakeholders (see Law 18 April 2017, n.48)	There is no synergy between the stakeholders	We work on parallel tracks, producing in different forms the same data in order to verify the actions taken. The data cannot be used in aggregate form.

Fig. 103: Possible problems in verifying the actions taken and their evaluation (source: UNI/PdR 48:2018).

33 Lynch K., (1960), *The image of the city*, MIT Press, Cambridge, MA.

34 Canter D., (1977), *The Psychology of Place*, Architectural Press, London.

poorly organised street furniture, contributing to the sensation of chaos. In this regard, studies on perception starting from K. Lynch[33] and on environmental psychology[34] are useful and fundamental for the planning of urban safety.

The flexibility of the space is another fundamental requirement for the achievement of a welcoming space that can incrementally adapt to the needs of its users. Very often public open spaces, even if aesthetically attractive and designed in detail, remain empty for the simple reason that they do not meet the citizens' wishes and above all because they do not easily lend themselves to functional transformation. It would be necessary, as much as possible, to involve future users in defining needs and, in any case, designers should follow the results of their projects in the medium and long term and intervene with incremental adjustments.

The unpredictability of the spatial experience and the possibility of freely choosing paths and more generally movement constitutes another primary psychological need for the human being. Numerous psychological and psychoanalytic studies show that humans often tend to reject a monotonous and repetitive space, which leaves no room for personal creativity. Many of the recent urban projects are fully defined and do not allow individuals to make them their own, to place signs that mark their territoriality, helping to start an identification process.
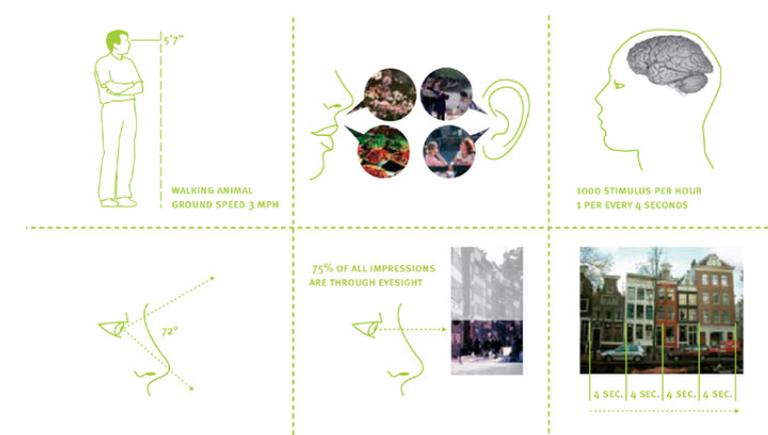
Fig. 104: Human senses are strongly connected to the way the city should be planned and designed (source: Gehl Architects, *Seattle Public Spaces & Public Life*, 2009).

In addition, there are generally recognised needs that constitute prerequisites for the reception and inclusiveness of the space, such as pedestrianisation and the resolution of conflicts with vehicular traffic. The pedestrianisation of parts of the city must, however, be accompanied by a wise localisation of uses (commercial uses in the first place), by the aesthetic renewal of the space, with the adoption of durable materials, and finally also with the installation of urban works of art.

The site and its position within the urban fabric and communication networks of the city remain significantly influential for the success of a space that is intended to be welcoming and inclusive. In other words, even paying attention to some of the last elements suggested above, sometimes public spaces remain little frequented and do not become welcoming, if they are not well connected to the rest of the city so as to overcome their marginal status.

The size of the spaces still proves to be a significant ingredient in

Fig. 105: Quality criteria for a good city network (source: Gehl Architects, *Seattle Public Spaces & Public Life*, 2009).

CONNECTS DESTINATIONS & PLACES	ENSURES BALANCE BETWEEN ROAD USERS	IDENTIFIES A HIERARCHY OF STREETS AND LINKS
• ensures access to transport hubs, visitor destinations and city services • ensures access to public squares and parks	• prioritizes soft road users i.e. pedestrians and bicyclists • new road types with shared space and pedestrian priority	• activates main streets by concentrating pedestrian flows, rather than spreading them out • identifies transport corridors
INVITES ALL AGES FROM CHILDREN TO SENIORS	**IS LEGIBLE, ACCESSIBLE & SAFE FROM ACCIDENTS**	**ENSURES A FEELING OF SECURITY - DAY AND NIGHT**
• ensures wide sidewalks and traffic signals for pedestrians • enforces low vehicular traffic speeds • provides bicycle tracks	• clear division between soft and hard road users • human scale signage - 3mph • applies guidelines and measures for disabled	• pedestrians and bicyclists concentrated on main routes at night • network well linked to main public transport hubs

Fig. 106: Study of
the open spaces for
the Seattle safety
project (source:
Gehl Architects,
*Seattle Public
Spaces & Public Life*,
2009).

OPEN SPACES DOWNTOWN SEATTLE

PUBLIC PEDESTRIANIZED STREETS AND SQUARES
PUBLIC PARK
PRIVATE PLAZAS WITH PUBLIC ACCESS

comparison: car free public spaces

Fig. 107: Study of
the open space
quality for the
Seattle safety
project (source:
Gehl Architects,
*Seattle Public
Spaces & Public Life*,
2009).

QUALITY OF OPEN SPACES ACCORDING
TO THE QUALITY CRITERIA (P. 49)

GOOD QUALITY
AVERAGE QUALITY
POOR QUALITY

Fig. 108: Study of
the perceived safety
during the evening
in Seattle (source:
Gehl Architects,
*Seattle Public
Spaces & Public Life*,
2009).

EVENING SAFETY

RESPONDENTS IN DEMOGRAPHIC SURVEY
FEEL UNCOMFORTABLE IN THESE AREAS OVERALL
CLOSED STREET FRONTAGES
DIM LIGHTING
TOO BRIGHT LIGHTING
EXPERIENCED AS UNCOMFORTABLE AT NIGHT
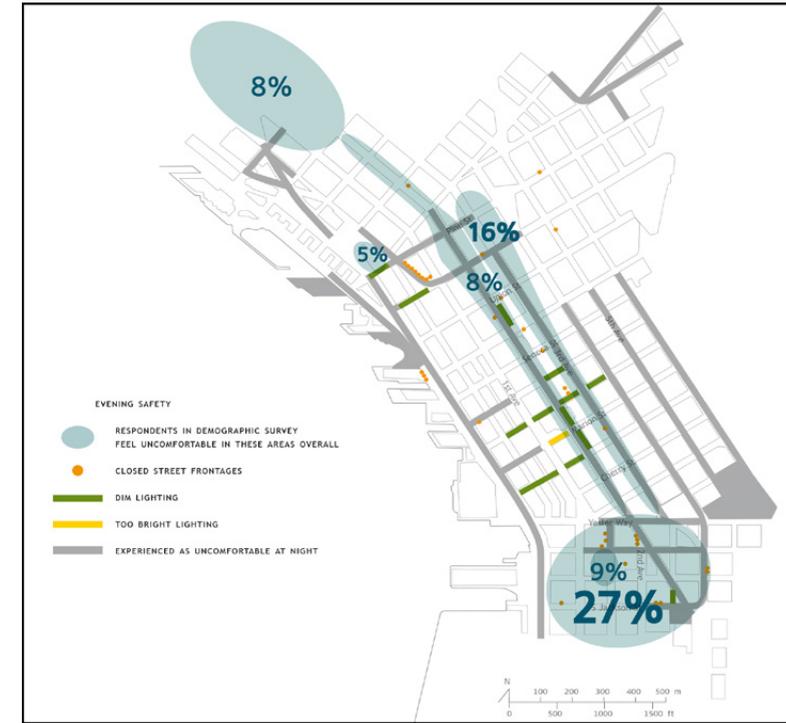
Fig. 109: Study of
the active places
in Seattle (source:
Gehl Architects,
*Seattle Public
Spaces & Public Life*,
2009).

PHYSICAL ACTIVITIES
CULTURAL ACTIVITIES
COMMERCIAL ACTIVITIES
CHILDREN PLAYING
LYING DOWN
ON MOVABLE CHAIRS
SECONDARY SEATING
CAFÉ SEATING
BENCH SEATING
WAITING FOR TRANSPORT
STANDING

AVERAGE FIGURES IN THE PERIOD BETWEEN 10AM-8PM ON A SUMMER WEEKDAY

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School	Chicago school, USA (1920)	Romantic school, USA (1961)	Newman the Young, USA (1972)	Newman the Purified, USA (1980)	Situational approach, UK (1980)	Spatial school, USA (1980)	Rock hard school, Worldwide (since 10,000 BC)
Authors	Shaw and McKay	Jacobs, Wood	Newman	Newman	Clarke, Mayhew and others	Brantingham and Brantingham (and others)	
Key work	Juvenile Delinquency and Urban Areas	The Death and Life of Great American cities	Defensible space	Community of interest	Designing out crime	Environmental criminology	
Area of Interest	Residence of juvenile offenders	Unsafe city streets. Crime site in relation to surrounding buildings	Architectural design of unsafe estates. Physical possibilities for control	The physical setting of social communities	Crime specific Criminal acts resulting from offenders meeting or seeking opportunities. Physical and social environment	Analysis of the location of crimes, to sort out patterns in the 'where, when and how' of crime	Physical strength of objects or parts of buildings
Main questions	Where do Juvenile offenders live? Why do they live there?	How to give city streets good crime preventing qualities?	Does a different housing design gives residents possibilities for exercising informal control over their environment?	See: Newman 1972	How to reduce opportunities for offenders?	Where does crime occur? Why there?	How to prevent (by physical means) people from breaking or demolishing an object or a building
Answer / theory	Where: Zonal model of urban form (Burgess/Park). Highest number of delinquents living in the concentric zone adjacent to the central business district (zone of transition/slums). Rates declining with increasing distance outwards. Why there: Social disorganization. Youth learn criminal behaviour from peers.	1. A clear demarcation between public and private space. 2. Eyes on the street (eyes of residents and eyes of people passing by). Buildings orientated to the street. 3. Streets must be busy and used continuously. Night shops, pubs, bars, etc. can create late hour activity.	Defensible space – natural surveillance coupled with residents feelings of territoriality	Informal control will flourish in a residential environment whose physical characteristics allow inhabitants to ensure their own security. Community of interest (grouping of life-styles)	Prevention strategies are different for each type of crime. In General: 1. Target hardening 2. Target removal 3. Removing the means to crime 4. Reducing the pay-off 5. Formal surveillance 6. Natural surveillance 7. Surveillance by employees 8. Environmental management	Without offenders no crime. Offenders make rational choices. Attention has to be paid to the decision making process of an offender which is time/spatially constrained: offenders prefer to operate in areas they know. Crime risks highest along movement paths of offenders and on borderlines of districts where a lot of offenders reside	Target hardening and urban alarm systems. Strength of the target has to keep pace with: • The offenders profit when they succeed (Fort Knox high profit, so this target must be quite hardened?) • Time needed to react (police, neighbours, employees, etc.)
Critique / remark	Research in Europe showed totally different pattern of residence. Danger of ecological fallacy	Research proved Jacobs 'sale streets' to be unsafe! More people – more trouble (especially pubs/bars). Physical determinism. See also Newman critique	Changing the physical environment does not necessarily result in different response to crime. The offender is neglected: how does he perceive D.S.; there are always ways to avoid surveillance. Methodological errors in research	Again: too much physical (or architectural) determinism. Offender still neglected. Strange: Newman 1980 causes little debate; is neglected or unknown in most European countries.	In the eighties the opportunity-focused Situational approach and the Spatial school become strongly intermingled. See e.g. Clarke and Cornish 1985: Criminal behaviour is seen as the outcome of the offender's broadly rational choices and decisions	See: Situational approach	Displacement of crime. Creates Bunker environment. Target hardening can promote fear of crime
Most useful application	Preventing youngsters from initial involvement in crime	Reduction of fear of crime by promoting community file	Creating better possibilities for natural surveillance and thus reduce feelings of insecurity. Effects on offenders seem to be at best moderate	See: Newman, 1972	Preventing a specific form of crime in a very practical (manageable) way. Fear of crime is hardly incorporated in the theory	Predicting which areas or routes are at risk; modelling offender's decisions by physical environmental changes makes rational crime policy (displacement policy) possible	Preventing victimization in particular case

Fig. 110: Summary scheme of the CPTED main schools (source: Davey, van Soomeren, Wootton, 2014).

the definition of hospitality, as it is easy to see when you cross a very large square, with the buildings placed at a considerable distance and with insufficient furnishings and trees to characterise the resting places. Indeed, it can be said that many of the suggested indications can only work in small squares and parks and in those interstitial spaces that connect the urban fabric.

An old conflict between two different styles of urban design is, therefore, envisaged in the creation of protected public spaces: the first style is based on the rigid and all-inclusive master plan, while the other one is organic, incremental, participatory and essentially more democratic. It is a matter of prefiguring spaces designed down to the details to which the users must adapt or, on the contrary, prepare spatial reservoirs capable of adapting over time to the needs of the users.[35]

The benefits and risks of these models have been widely discussed in the disciplinary debate (C. Alexander, Sennett, Brand), highlighting a greater efficiency of the 'natural' design approach to the city which adapts over time to social needs compared to the 'technical' one, derived from modern rationalist culture. As Alexander[36] (2004) argues, the transformation of the city lends itself more to an organic and incremental metaphor than to a mechanistic and technical one and, by adhering to this approach, the protection of public space appears to be more feasible with adaptive solutions, conflict resolution, integration and participation than by adopting the technical devices of video surveillance, metal detectors, dissuasive furnishings

35 Economic benefits would also derive from this approach because binding spaces, if they do not work, are more difficult to change if not with greater costs.

36 See his 2004 Shumacher lecture, partially available on the website www.living neighbourhoods. org

Fig. 111: Aerial view of Vauban neighbourhood in Freiburg, Germany. It can be considered as a sustainable neighbourhood as its design follows environmental, economic and social safety principles (source: https://www.researchgate.net/figure/Aerial-view-of-Vauban-neighbourhood-in-Freiburg-Germany-Copyright-permission-by-Erich_fig1_332770876).

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Fig. 112: Kronsberg district in Hannover, Germany, another sustainable neighbourhood (source: http://www.pizzatravel.com.ua/eng/germany/9/kronsberg_district_in_hannover).

and access restrictions.

However, it must be pointed out that urban design does not have such a deterministic role and it cannot be asserted that a certain way to design space will certainly influence the behaviour of its users. First of all, the complexity of the human species and the differences of the individual responses to the stimuli of the environment make it directly evident. However, it can be said that the physical organisation of the space interacts with the other factors of the 'place', such as the historical-geographical characteristics, the management, the culture of the local community, and it can be considered co-responsible for the onset of urban insecurity.

UNI CEN TECHNICAL REPORT 14383-2 STANDARD

The Technical Report provides a framework for crime prevention in urban planning, introducing safety criteria in project realization and evaluation. Annex D is dedicated to the safety diagnosis of urban projects and offers practical support for interventions.

MAIN PRINCIPLES

• Sense of belonging and identification with the place increase both security and perception of security
• The vitality of public spaces and functional mixitè help preventing crime, stimulating spontaneous surveillance
• To improve safety, urban planning and design must avoid creating spaces without vitality, indefinite or hidden
• The vitality of public spaces and functional mixitè help preventing crime, stimulating spontaneous surveillance
• A continuous urban fabric and a public spaces' clear design improve users' orientation and perceived security
• Ensure accessibility adopting maintenance and control (organized surveillance) measures to prevent degradation

MULTI-AGENCY PROCESS TO INTEGRATE SAFETY CRITERIA INTO PROJECTS

LOCAL AUTHORITY (RESPONSIBLE BODY)

• Take on the official commitment to urban safety
• Formulate general goals
• Appoint the person in charge of the procedure
• Create the Working Group

WORKING GROUP

• Establish the intervention program
• Respond to the Local Authority
• Define consultation system with other stakeholders
• Conduct crime and urban criticalities analysis

PLANNING DOCUMENT of the Working Group

• Illustrate the context
• Identify strategies and define actions
• Estimate the costs & evaluate effects and risks

LOCAL AUTHORITY DELIBERATION

• Define the strategies and actions to implement
• Highlight the aspects to be explored
• Draft the realisation programme

DEAL WITH STAKEHOLDERS

• Responsibility of all parties involved (organigram)
• Programme for implementing the interventions
• Intermediate checks

REALISATION ACTIONS

• Each party carries out its role
• Checks of each phase of implementation

RESULTS' ASSESSMENT

• Definition of criteria and methodologies

CORRECTIVE MEASURES

Fig. 113: Diagram of the characteristics of Annex D of the UNI CEN Technical Report 14383-2 Standard

Fig. 114: Summary of the UNI CEN Standard's process

Fig. 115: Design method by the author for an urban security project (Acierno, 2003)

VI. METHODOLOGICAL PROPOSAL: S-RGB DESIGN

Keywords: *s-RGB, planning methodology, green-blue infrastructure, safety, regenerative, urban acupuncture, functional transect, partivipation*

6.1 safe-Regenerative Green Blue Design

The proposal made in this book qualifies as 'multi-scalar design', a practice that acts on open spaces, ecological networks and green infrastructures but also on the regeneration of the focal centres of the urban organism. Different multilevel approaches, from territorial to micro-urban tools (urban acupuncture), are integrated in the methodological proposal defined as 's-RGB Design' (safe-Regenerative-Green & Blue Design).

Fig. 116: Multi-scalar approach of urban project integrating different kind of design tools.

TOP-DOWN APPROACH   GREEN AND BLUE INFRASTRUCTURE

Technical-government process   Urban macro-objectives   Multidisciplinary point of view

VERIFICATION TOOL   FUNCTIONAL TRANSECT

Territorial analysis   Intervention control   Benefits evaluation

BOTTOM-UP APPROACH   URBAN ACUPUNCTURE

Listening to the population   Feedback of the key points   Social partecipation

The acronym is borrowed from the *standard RGB* created in the IT field in the second half of the 1990s and used on video screens, printers and the internet. Designed to be used indoors and in low light, it allows the user to look differently at the real world through computer technology lenses. By transferring the concept to territorial and urban planning, we intend to highlight the need for a new approach, in order to change the point of view on the territory, aiming to regenerate the contemporary city and to restore green and blue infrastructures, also guaranteeing greater security for the settlements.

Regeneration shall be understood in broad terms as connected to restoration, rehabilitation, redevelopment, rehabilitation of urban areas and buildings. Regenerative interventions are based on an ecological approach that, often starting from urban micro-acupuncture interventions, can trigger virtuous mechanisms along the integrated green infrastructure networks. Acupuncture interventions may refer to the redevelopment of abandoned or discarded areas of the city in order to be implemented and also through temporary physical installations (small buildings, street furniture, pocket garden, street art, etc.) or virtual ones (augmented and virtual reality, etc.) which use digital technology for educational purposes (Iaconesi & Persico, 2017; Pagliano, 2019). In particular, the phenomenon of temporary uses, or those actions limited in time that are activated in deserted or degraded places, in a more or less informal way, by subjects other than the owner of the space itself (Bishop & Williams, 2012), place themselves in the wake of urban voids: the so-called *temporary ur-*

Fig. 117: Paley Park in Manatthan, New York, a quiet urban oasis in the midst of the bustling city thanks to the careful use of falling water, airy trees, lightweight furniture and simple spatial organization (source: https://www.myusa.it/myusa-blog/paley-park-new-york.html).

Fig. 118: Temporary urbanism in the Ile-de-France district, Paris, by the IAU-IDF Institute (source: https://www.institutparisregion.fr/).

banism, which includes practices of re-appropriation and reuse of abandoned spaces or containers in a transitory way, has consistently become part of sustainable planning theories since the beginning of the century, taking on connotations and different meanings with the consolidation of the practices themselves (De Girolamo, 2015). In relation to this approach and the urban acupuncture's flexibility and reversibility, the example of the *portable streets* devised by Jaime Lerner is interesting. These are portable stands that, once assembled together, form modular transportable boutiques. The latter make it

Fig. 119: Model of Lerner's portable streets (source: https://brightideastomakelifebetter.wordpress.com/2014/10/01/portable-streets-designed-by-jaime-lerner-arquitetos-associados/).

possible to conform the place for exhibitions or commercial purposes of any kind in a very short time, revitalising degraded areas of the city: there is both an economic advantage for the owners of the stands and a benefit for residents and visitors who can enjoy spaces full of life again. At the end of the event, the portable streets can be easily disassembled and placed elsewhere, even in different configurations (El Masseidy, 2016).

Very often these degraded areas also represent an opportunity for the development of new ecological networks, cultural itineraries, light mobility and new forms of urban agriculture; anyway, the safety of the users must be guaranteed in the project.

6.2 Methodological phases and tools

The proposed methodological approach consists of a phase of *analysis* aimed at collecting general data about the area (land use, hydrography and natural resources, historical evolution, functional components of the settlement system, census of territorial endowments, infrastructural system of the modes of transport), represented on special thematic maps using GIS technology. Consider, for example, the *Public Participation Geographic Information System* (PPGIS): thanks to interviews and workshops, the analysis allows the researcher to collect data from all the stakeholders involved in order to develop a map that incorporates quantitative and qualitative information; then integrating the use of Google Maps, it is possible to obtain the *marker maps*, which identify qualitative data geographically using symbols and spatial markers (Burkhard & Maes, 2017). The GIS can also be associated with more articulated participatory tools, such as Geodesign, which studies complex problems in multi-stakeholder contexts: through a guided framework, we obtain spatial data related to the history of the area, the invariants of the territory, the constants (approved and financed projects that are next to the realisation) and to the requests of the clients: such information can be easily managed through GIS.

During the analytical phase, we proceed at the same time with a bottom-up reading of the territory, through interviews with representatives of the local community, from the privileged interlocutors that are the institutions' members to the ordinary citizens, with the purpose of bringing out the fruitful perceptions of the urban space and the criticalities felt in specific sites, identified as 'focal points' of the urban organism.

Acupuncture projects essentially aim at intervening on degraded and/or abandoned areas of the city, on a limited scale, referring to open spaces, parks or gardens, brownfields' portions, infrastructural stations or interstitial fragments of urban space.

Moreover, it is possible to use specific qualitative and quantitative surveys with which to study different urban spatial environments according to the elements that influence the psychological and security component. As far as open spaces are concerned, once the typology and perimeter of the area has been established, it is necessary to investigate the ownership (if it is a public or private space), after which any valuable visuals towards characteristic-identity elements or towards landscape emergencies; we will also study the detractors of perceptive quality both in relation to the aforementioned relevant views and in relation to the presence of obstacles to actual security (presence of isolated gorges, dead ends, paths that are not clearly identified, the overall vitality of the place). The study of roads must first highlight their type and use of vehicles, pedestrian or mixed; then, there will be established the state of maintenance and the presence of bicycle lanes or urban furnishings, elements that on one hand can promote the vitality of the place, on the other hand they can hinder the escape of possible criminals, discouraging them from committing crimes; the eventual absence of lighting and signs of physical degradation may indicate a perceptive alteration of safety, while the presence of facades overlooking the road can favour informal control; finally, attention will be paid to the critical nodes of bus stops. Also the buildings present in a given neighbourhood influence the users' feeling of safety: for this reason, they will

Fig. 120: Urban community accomplishing the first step of Public GIS that is sketchin maps (source: http://wpmu.mah.se/nmict182 group2/2018/10/23/the-power-of-maps-participatory-gis-for-disaster-prevention/).

be analysed first spatially, dimensionally and morphologically, after which the maintenance status and the possible presence of degradation will be evaluated; the destination of use and the possible use of the ground floor will be evaluated, in order to estimate the presence of a functional *mixité* that guarantees diversified uses during the day; accessibility and the living environment are also important factors to establish how much these elements of the urban body contribute to the perception of overall safety.

On the basis of this information, more or less temporary regenerative interventions of various types can, therefore, improve urban safety and the positive perception of space thanks to the active use of the site, the increase in the flow of users and improved lighting. These are factors that create in the individual a feeling of psychological well-being, moreover, they reduce the possibility of situational crimes, such as theft or aggression.

Before proceeding to identify the design solutions, the second methodological phase prefigures a critical evaluation of the analysed resources, carried out through a preliminary definition of the values' priority allocation strategies, drawn up according to indicators coherent with the assessment strategies. The evaluation then flows into a critical synthesis in order to highlight the problems of the area and its criticalities: these elements are in fact the base of the design choices in the next phase.

The strategy for the definition of the assessment objectives is in line with the multi-functional approach of the green infrastructure

Fig. 121: The potential constituent elements of the green infrastructure, according to three scales intervention (source: EEA Report, 2011).

Table ES.1 Potential assets that make up green infrastructure grouped into three scale groups

Local, neighbourhood and village scale	Town, city and district scale	City-region, regional and national scale
• street trees, verges and hedges • green roofs and walls • pocket parks • private gardens • urban plazas • town and village greens and commons • local rights of way • pedestrian and cycle routes • cemeteries, burial grounds and churchyards • institutional open spaces • ponds and streams • small woodlands • play areas • local nature reserves • school grounds • sports pitches • swales (preferably grassed), ditches • allotments • vacant and derelict land	• business settings • city/district parks • urban canals • urban commons • forest parks • country parks • continuous waterfronts • municipal plazas • lakes • major recreational spaces • rivers and floodplains • brownfield land • community woodlands • (former) mineral extraction sites • agricultural land • landfill	• regional parks • rivers and floodplains • shorelines • strategic and long distance trails • forests, woodlands and community forests • reservoirs • road and railway networks • designated greenbelt and strategic gaps • agricultural land • national parks • national, regional or local landscape designations • canals • common lands • open countryside
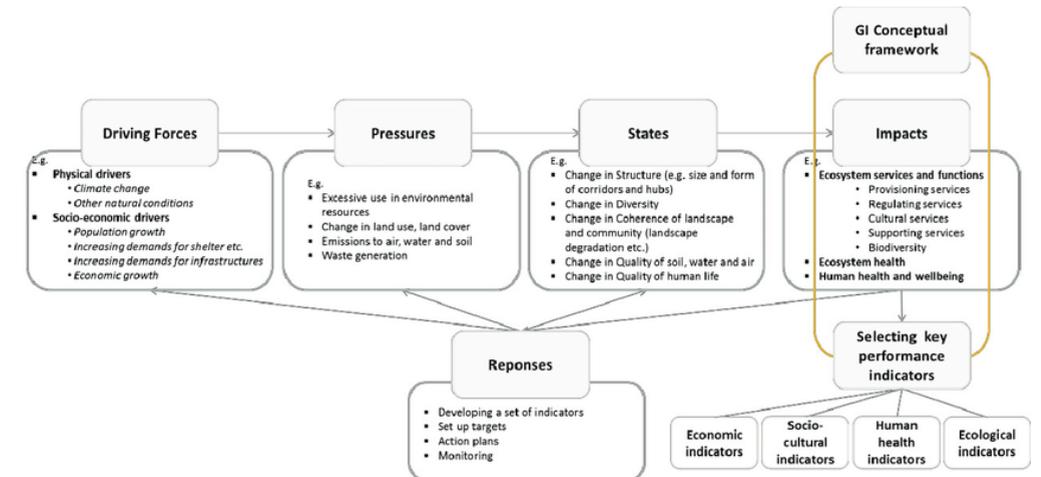
for the choice of indicators and for the attribution of value judgments on the conditions and resources of the studied landscape-territorial system. To this end, the DPSIR (Drivers, Pressures, State, Impacts, Responses) is used as one of the assessment methods proposed by the EU for the verification of territorial plans and projects. The drivers represent the determinants, that is, the role that the economic-productive and socio-cultural activities, as well as the natural criticalities, have towards the environmental balance; pressures indicate the effects of human activities on the reference framework; the state describes the current environmental and resource quality while the impacts indicate the ecosystem alterations in a broad sense; finally the responses offer policies, plans and actions of various kinds with the aim of countering negative impacts and restoring the balance of the system.

This method has the advantage of simplifying the reading of the existing conditions, also facilitating the identification of critical issues that slow down urban metabolism, in social and environmental terms. In the implementation trials, the scheme proposed by Pakzad and Osmon (2015) has been taken as reference, suggesting suitable indicators for the purpose.

The city is in fact characterised by an evident functional, aesthetic and managerial complexity. For this reason, it is necessary to diversify the interventions provided for in a project hypothesis. The zonal composition of the city is marked by a different level of criticality, categorisable from a minimum value to a maximum value. Unless an adequate urban design protects their characteristics, the different urban areas run the risk of incurring, in the short term, transformations that are harmful to the entire city system. Therefore, the use of an additional analytical instrument is hypothesised, namely *urban*

Fig. 122: PThe DPSIR model proposed by Pakzad and Osmon to conceptualize the interaction between human activities and green infrastructure structure and performance (source: https://www.researchgate.net/figure/DPSIR-framework-of-linkage-between-human-activities-and-green-infrastructure-performance_fig1_291357054).

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chromatic thermography.

This tool is similar to thermography used in architectural practice in order to highlight the thermal bridges of buildings: through the information obtained from the aforementioned direct and indirect analysis methods, it is possible to classify urban areas of different sizes with different colours. The colour then becomes a fundamental element for the *Chromatic City*, in order to elaborate the synthesis table illustrating the greater or lesser propensity for regenerative transformation.

In this case, by criticality is meant the presence of interests, mainly economic, by the stakeholders in certain parts of the city. These elements weigh on the focal points of the urban fabric, compromising the integrity of the present cultural, environmental and social values, risking altering their intrinsic quality. Another parameter to be taken into consideration, also as a result of the combination of the afore-mentioned three values, is the identity of the urban system which, moreover, connotes the propensity of citizens to accept positively or negatively transformations of parts of the city.

From the application point of view, the analytical tool shows a

chromatic gradient that describes localised urban transformability. The cold colours, tending to blue, indicate the areas that are less subject to harmful changes; the warmer colours, with yellow-red tones, instead show the points of the city that are considered more attractive to investors, but at the same time more vulnerable and sensitive to the loss of their urban identity. The latter will be the focal points towards which the interventions planned by the experts will be directed, in order not only to protect the existing qualities but also to enhance them. Therefore, urban chromatic thermography also has the task of temporally marking the design actions: in fact, it is not possible to realise an entire urban master plan in a single moment. The red areas will, therefore, have operational priority, progressively following the project timeline defined thanks to this tool (Acierno, Pistone, Scaffidi, 2019).

The third phase is about the multi-scalar project and it starts from the prefiguration of alternative scenarios and consequently the choice of priority interventions. The master plan is built on the prefiguration of a multifunctional green infrastructure, composed of integrated networks: naturalistic networks (green and blue network), a network that brings together sites to be regenerated and cultural assets to be exploited (red network) through sustainable tourism and, finally, networks of slow mobility.

The localised urban acupuncture projects are located along the

Fig. 123: The urban-to-rural transect defined by the New Urbanist Andrés Duany (source: http://kronbergwall.com/zoning-codes-101-the-transect/).

Fig. 124: Methodological summary of the proposed approach.
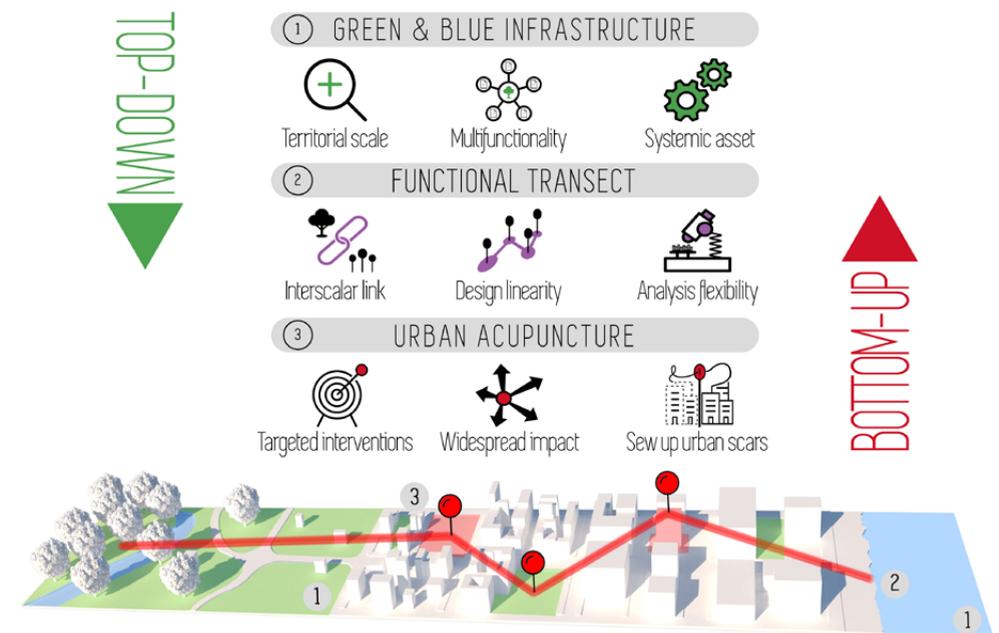
green infrastructure networks and, in order to check the consistency of the latter with the entire urban organism, the lines of the 'functional transects' are traced, following an articulated trend. This approach is inspired by the urban-to-rural transect or an analytical-design system that identifies the different human and natural habitats according to their composition through the use of codes and indicators (Davis, Duany, Plater, Zyberk, 2002). This is possible by longitudinally cutting the territory so that the section incorporates particularly relevant elements of the site (Geddes, 1915).

The functional transect must be proposed as an operative-evaluative technique in support of urban regeneration, incorporating both the concept of Succession and the concept of Subsidiarity (Duany, Roberts, Talen, 2014).

The first expresses the temporal dimension comparing the current condition of the analysed city with hypothetical future scenarios that could occur, considering all the components that could positively or negatively influence urban progress.

Subsidiarity, on the other hand, is an important estimative tool that allows the researcher to evaluate the implications that certain decisions entail.

All these elements will result in the creation of urban boundary lines that will allow to linearly direct the extent of urban development, operating on a scale of greater detail and thus respecting the criteria of a sustainable and ecological culture.

ANNEX

DESIGN EXAMPLES

ANNEX - DESIGN EXAMPLES

Example 1 – Multi-Scalar Regeneration & Green Blue Design: the case study of Mangalia³⁷

Fig. 125: Main elements of the territory of Mangalia. The northern part of the city is characterized by a great number of resorts.
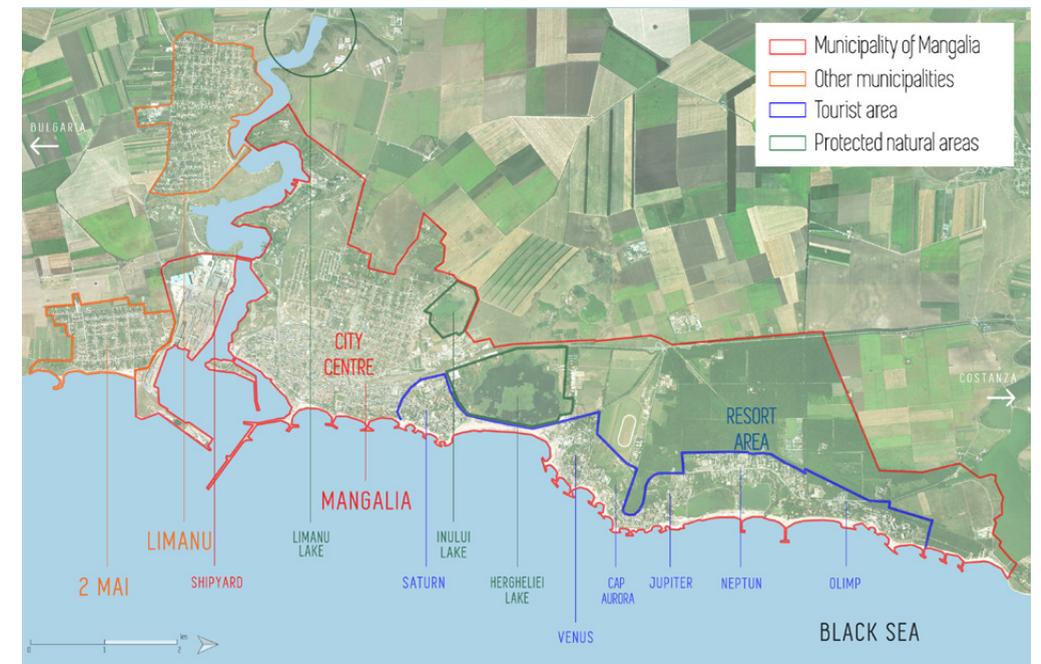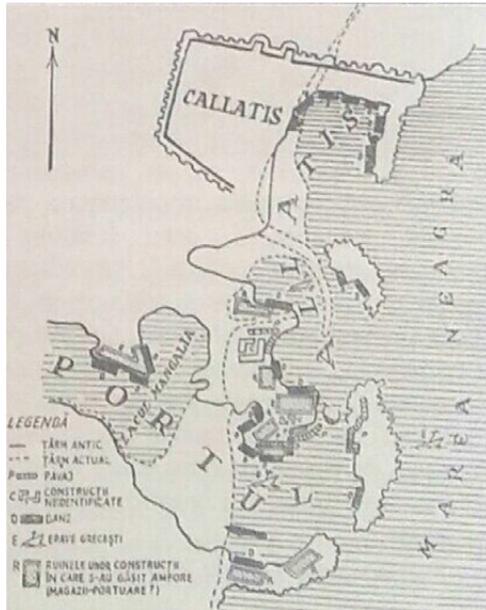
Mangalia is a Romanian coastal city overlooking the Black Sea, in the Dobrogea region: this area has a great importance in the Romanian economic and organisational system, in fact it is the only real gateway to the maritime connections of the country.

Tourist activity is a fundamental pillar of the local economy of Mangalia: every year the city hosts around 300,000 tourists, almost ten times its winter population of 40,500 inhabitants, drastically and

rapidly saturating all of the available spaces. This has, therefore, transformed the entire urban structure over the years, leading to the creation of massive resorts and buildings for tourist accommodation.

Mangalia is unanimously considered the oldest among the cities of Romania, finding its roots in the 6th century BC with the name of *Callatis*, a flourishing Greek colony. The logistical potential of the port city attracted the interest of different foreign rulers over the centuries that made the city increasingly multicultural. After the Second World War, the Socialist party of Nicolae Ceaușescu imposed his dictatorship in Romania and, consequently, in Mangalia: in particular, in the 1960s, the city saw the creation of numerous living blocks and new modernist resorts, real summer towns that overwrite almost all of the original urban fabric. With the fall of the Berlin Wall in 1989, after half a century of dictatorship, Romania finally freed itself from Ceaușescu's grip: despite this, the long-standing imprint of Socialism had by now definitely marked the urban layout of Mangalia and also the successive democratic governments would have had to face the evident damage of the previous regime (Lăpuşan A., Lăpuşan S., 2007).

The first phase of the analytical process pursued the principles of

the bottom-up approach. The creation of a reference social database through quantitative interviews with the inhabitants, community desks and brainstorming with the main stakeholders and the historiographical study of the fabric of Mangalia have allowed identification of the sensitive elements of the territory and classification of different types of 'potential heritage'. The first category refers to the 'forgotten historical pre-existences', which means the archaeological remains of the Greek-Roman era and the few examples of traditional architecture dating back to the 1920s: since most of the population is unaware of their existence, these elements tend to pour into a widespread state of abandonment, often crushed by buildings incompatible with their value.

The second group instead includes examples of 'tolerated socialist architecture': in this case, we talk about the vast tourist facilities built during the 1960s under the Ceausescu's dictatorship; although they do not present particular aesthetic features, these massive ar-

Fig. 130: House of Culture, architecture symbol of socialist power.

chitectures have proved to be economically viable, as well as being a destination for study trips due to the unique use of the brutalist style that distinguishes them.

Finally, 'renegade socialist architecture' means the large number of modernist buildings in the historic centre of Mangalia: in this case, we are talking about constructions characterised by an evident architectural relevance that is not recognised by the population. This is due to the persistence of an attitude of rejection that is still too strong towards the dictatorship that generated them: together with the lack of a function that, as in the case of the resorts, makes the socialist origin of these architectures at least bearable, this factor does not allow the de-contextualisation of the aforementioned architectural works from the recent period of oppression to which the Romanians have been subjected.

The bottom-up analysis was accompanied by a territorial study of the naturalistic-environmental, settlement and infrastructure systems investigating the criteria of the top-down approach.

The naturalistic-environmental system consists of rural areas in the peri-urban zone alongside extensive uncultivated areas. The lake areas, included in the Natura 2000 protection network, and the vast coast along which the city is structured are also part of this system. These elements represent a fragmented mosaic of potential green and blue infrastructures.

The transport system is mainly based on the municipal road network that guarantee a connection within the city centre and with other Romanian cities. The port hub positively characterises the coa-

stal area, while railway connections appear to be lacking.

The settlement system presents a better architectural and service quality in the limited historical centre and along the coastal strip; however, its integrity appears to be threatened by the strong pressure exerted by social housing construction and by building speculation which entails a progressive expansion of the built areas, a practice legitimised by the General Urban Plan (*Planul de Urbanism General - PUG*). At the base of the local economy, there are also manufacturing plants such as the shipyard and food processing plants and the vast resorts' zone in the eastern part of Mangalia that is still spreading. The analysis of the latter urban system shows the existence of two further opposing infrastructures. The *red infrastructure* comprehends the territorial network of the historical and cultural heritage, often crushed by the grey infrastructure[38] produced by the massive urbanisation of poor quality.

The project proposal tries to limit the further development of the grey infrastructure and aims to create an integrated green infrastructure, re-establishing a cohesion between its green, blue and red components: the red infrastructure will govern the regeneration of the historical-cultural areas, the green infrastructure the enhancement of agricultural-natural and relational sectors, while the blue infrastructures the coastal-lakes ones.

38 The grey infrastructure includes the urban sprawl and the degraded areas that form the drosscape, as well as the mobility network that does not encourage the pedestrian and bicycle traffic: these elements also negatively affect the green infrastructure because they do not respect the criteria of sustainable design.

Fig. 131: The town hall of Mangalia, one of the very few remaining examples of traditional Romanian architecture.

Fig. 132: Systemic analysis of the municipal territory.

NATURA 2000 PROTECTED AREAS

NATURA 2000 PROTECTED AREAS

SPA PROTECTED AREAS

UNCULTIVATED GREEN AREAS

AGRICULTURAL AREAS

COASTLINE

PRODUCTION AREA: SHIPYARD

PRODUCTION AREA: FACTORY

AGRI-FOOD PRODUCTION

MILITARY AREA

PUBLIC EQUIPMENT

PUBLIC SPORTS EQUIPMENT

PUBLIC BUILDINGS

BUILDINGS OF HISTORICAL IMPORTANCE

RECEPTIVE-CULTURAL BUILDINGS

TOURIST ACCOMMODATION

MUNICIPAL ROADS

SUPRA-MUNICIPAL ROADS

EUROPEAN ROADS

RAILWAY LINE

RAILWAY STATIONS

HARBOUR

BLACK SEA

E 87

km

0   1   2

Fig. 133:
Masterplan for
Mangalia. The
interventions are
classified according
to the red, green
and blue
networks.

BUCAREST

BULGARIA

COSTANZA

BLACK SEA

GREEN INFRASTRUCTURE

NEW PROTECTED AREAS
INTEGRATED MANAGEMENT OF THE EXISTING PROTECTED AREA
EQUIPPED URBAN PARK
RURAL-COMMERCIAL POLE (FOOD HUB)
RURAL-PRODUCTIVE POLE
RURAL-TOURIST POLE
RECONVERSION OF INDUSTRIAL AREAS
RECONVERSION OF COMMERCIAL AREAS

SUSTAINABLE ARCHITECTURAL AND URBAN COMPLETION
PUBLIC SPORTS EQUIPMENT
GREEN PARKING
MOBILITY HOTSPOT
TRAMWAY STATION AND BIKE SHARING
TRAMWAY STATION
EXTENSION OF THE TRAMWAY LINE
RECONVERSION OF TRACKS FOR ELECTRIC TRAM

GREEN CORRIDOR
FAST ROAD (PARKWAY)
SLOW ROAD
SHARED ROAD
CYCLING/PEDESTRIAN TRACK (SOFT MOBILITY)
RURAL AREA
PRIVATE GARDENS AND SIGNIFICANT URBAN GREEN AREAS

BLUE INFRASTRUCTURE

REMEDIATION OF POLLUTED
LOCALIZED ARTIFICIAL FILL OF THE COAST
NEW PROTECTED AREAS
EXTENSION OF THE ARTIFICAL REEFS
LIMIT TO INTENSIVE BATHING

RED INFRASTRUCTURE

LOCALIZED URBAN RESTORATION
ARCHITECTURAL AND URBAN REDEVELOPMENT
MUSEUM-RECREATIONAL POLE
FUNCTIONAL DIVERSIFICATION
RECOVERY OF THE HISTORICAL HARBOUR
HISTORICAL-CULTURAL PROMENADE

0   1   2   4
km

GREEN NETWORK INTERVENTIONS

MOBILITY NETWORK INTERVENTIONS

BLUE NETWORK INTERVENTIONS

RED NETWORK INTERVENTIONS

Fig. 134: The different networks that compose the project for Mangalia.

39 The resorts have been designed without the heating system, therefore, for exclusive summer use. For their functional recovery in the winter period, a system integration of the buildings will be necessary.

A general master plan was drawn up for the city of Mangalia by differentiating the project actions in relation to the different networks.

The green infrastructure project provides for an integrated management of existing protected areas, extending the protection constraint to other relevant areas as well as strengthening public facilities, while operating a sustainable reconversion of grey areas; in order to reduce the negative impact of intensive agriculture on the natural heritage, a reduction of the cultivated fields is assumed, in addition to increasing the quality of private green spaces within the city: in this way, it is possible to intertwine the green infrastructure with the urban tissue.

Accessibility is improved through the hierarchisation of road flows: in peripheral areas of the city, a system of parkways will connect Mangalia to the main neighbouring centres; in the inner zone the connections will be delegated to slow roads, on which green corridors will be grafted, and to shared roads, in which pedestrian mobility will be superordinate to the vehicular one; finally, cycle tracks and footpaths will guarantee a better use of the city, while the conversion of the existing railway line into an electric tramway line will integrate road mobility, offering an ecological and widespread alternative for moving around in urban and extra-urban areas.

The blue infrastructure is based on the rehabilitation of polluted water near industrial areas, but also building up localised artificial beach using appropriate filling materials and on the prolongation of existing artificial reefs in order to preserve the coastal zones that are particularly threatened by the risk of erosion; furthermore, these actions will be integrated with limits to intensive bathing near protected areas and with the creation of new protection areas, especially in relation with lakes of significant natural value.

The interventions aimed at creating a red infrastructure change depending on the specific urban area of interest. In the historic centre, localised urban restoration operations are planned for the modernist heritage, as well as an architectural-urban redevelopment for the sparse examples of traditional Romanian architecture; the creation of a recreational-museum centre in the area of the local archaeological museum and the recovery of the historic dock are also hypothesised. In order to maximise the potential of the resort area, a functional diversification of the various hotels has been hypothesised, so that they can extend their activity period even into the winter months.[39] Finally, a cultural-historical promenade will connect the focal points of the network, passing through the coastal area and inland and converging in the bike and pedestrian paths.
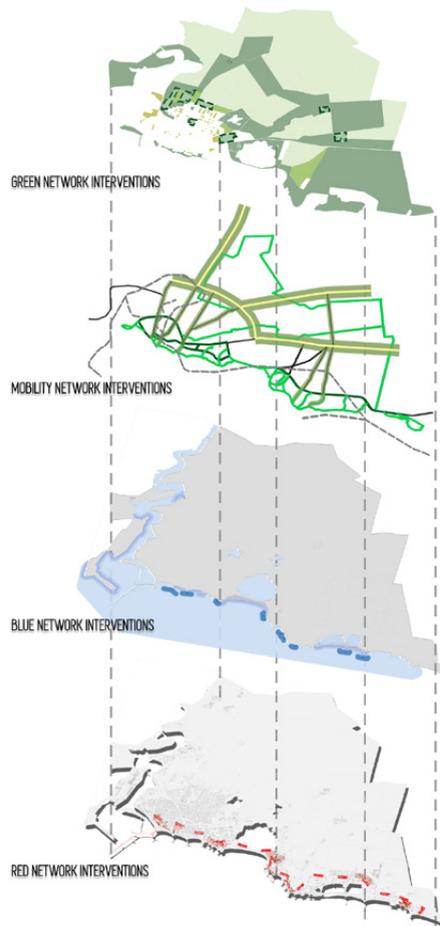
The small-scale urban acupuncture projects assume the task of starting the regenerative process and gradually composing the general master plan, working on the focal points that have been identified in the analysis phase. Even the various hypothesised acupuncture projects need to follow an effective, practical implementation logic.

For this purpose, the analysis was summarised in a table of 'urban chromatic thermography', through which the degree of criticality of the urban territory of Mangalia is expressed.

Unless a design process is in place that respects the environmental and identity characteristics, the different urban areas could further deteriorate, resulting in transformations that are harmful to the entire urban system: a diversification of interventions is, therefore, fundamental. To this end, sections relating to different types of transect have been traced, showing that the urban centre is the most critical area of the city: the implementation priority is, therefore, given to acupuncture projects placed along the transects that cross the aforementioned area.

In accordance with these premises, two interventions related
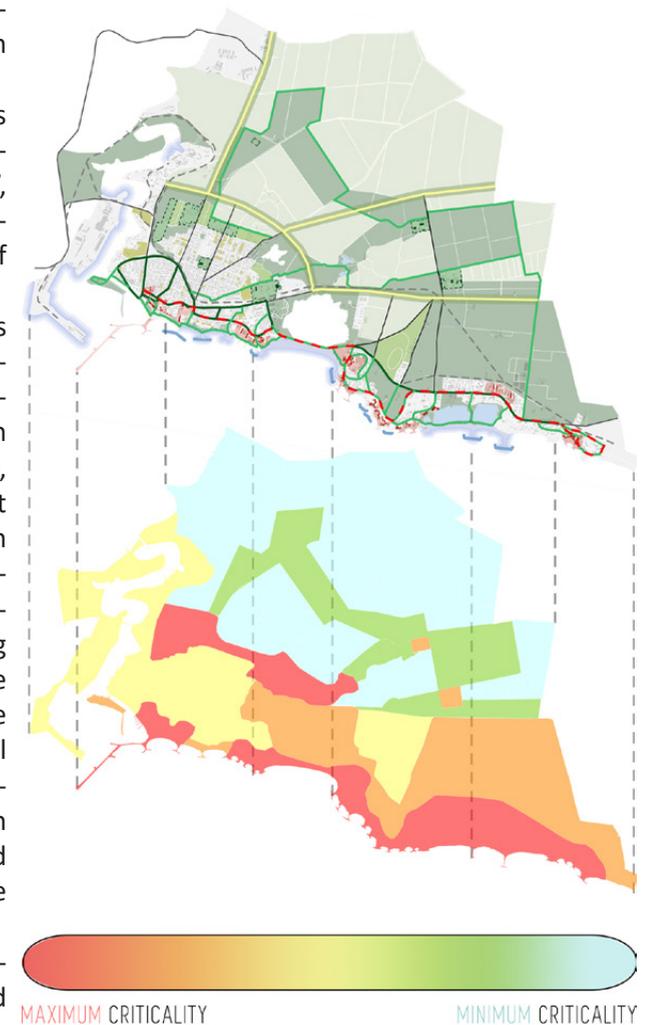
Fig. 135: Chromatic urban thermography for Mangalia's territory. The red areas are the most critical ones, while the blue ones are less problematic.

MAXIMUM CRITICALITY   MINIMUM CRITICALITY

Fig. 136: Designed urban acupunctures for regenerating Mangalia.

CONVERSION OF THE INDUSTRIAL AREA
▶ Regeneration of the inner-city natural spaces
▶ Limits to the impact on the enviroment

PRODUCTIVE AND COMMERCIAL POLE
▶ Broad green area functional to the community
▶ Development of the local rural economy

CONVERSION OF THE COMMERCIAL AREA
▶ New space for the citizens to relax
▶ Core of the commercial activity of the city

LOCALISED RESTORATION OF THE CITY CENTRE
▶ Improvements of the services standards
▶ Enhancement of the existing public spaces

RECREATIONAL AND MUSEUM POLE
▶ Historical and identity features' regenation
▶ Multifunctional space for the community

ACTIONS ON THE SOCIAL HOUSING ZONES
▶ Improvement of the architectural quality
▶ Enhancement of the public green areas

Realizing the entire masterplan for Mangalia **at once** would be **too expensive**. The **urban acupuncture** has the task of highlight the **focal points** previously detected with the **bottom-up approach**: in this way, the regeneration of the city becomes a **possible and actually sustainable target**.

● Main acupunctures
● Minor acupunctures
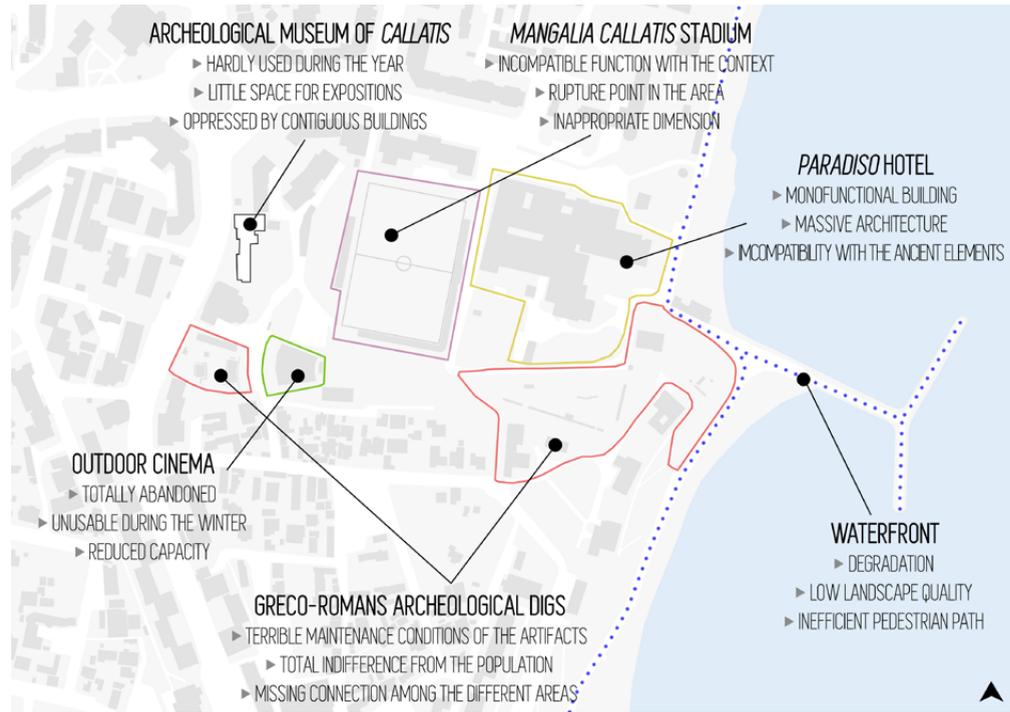
Fig. 137: At the top, the current state of the archaeological museum area and, at the bottom, the urban acupuncture project for the creation of the recreational-museum pole.
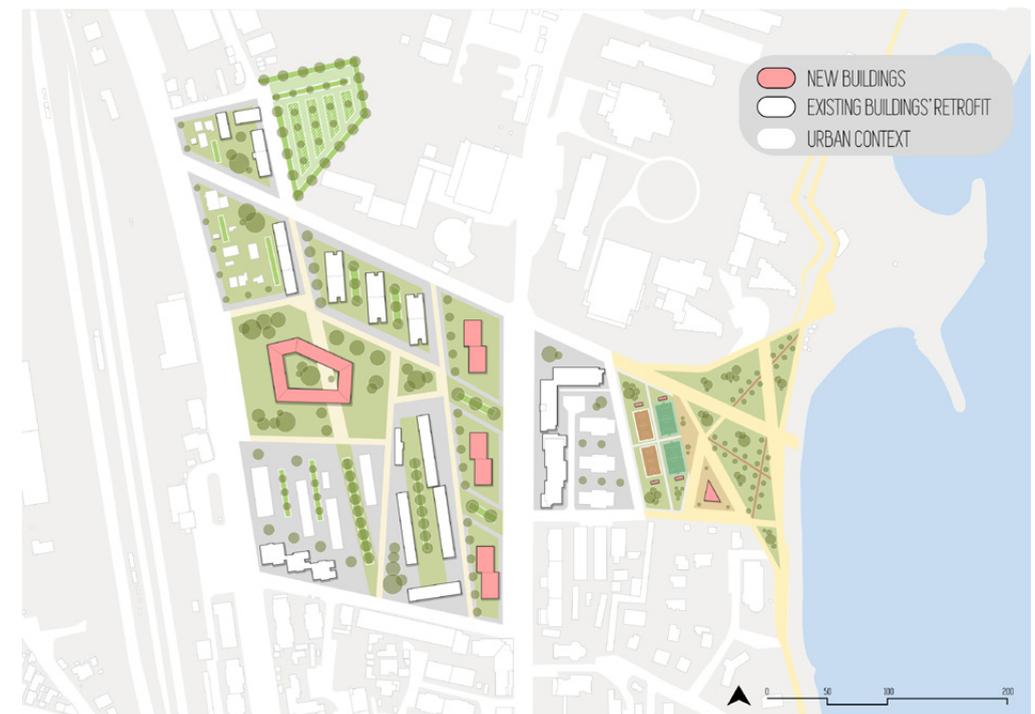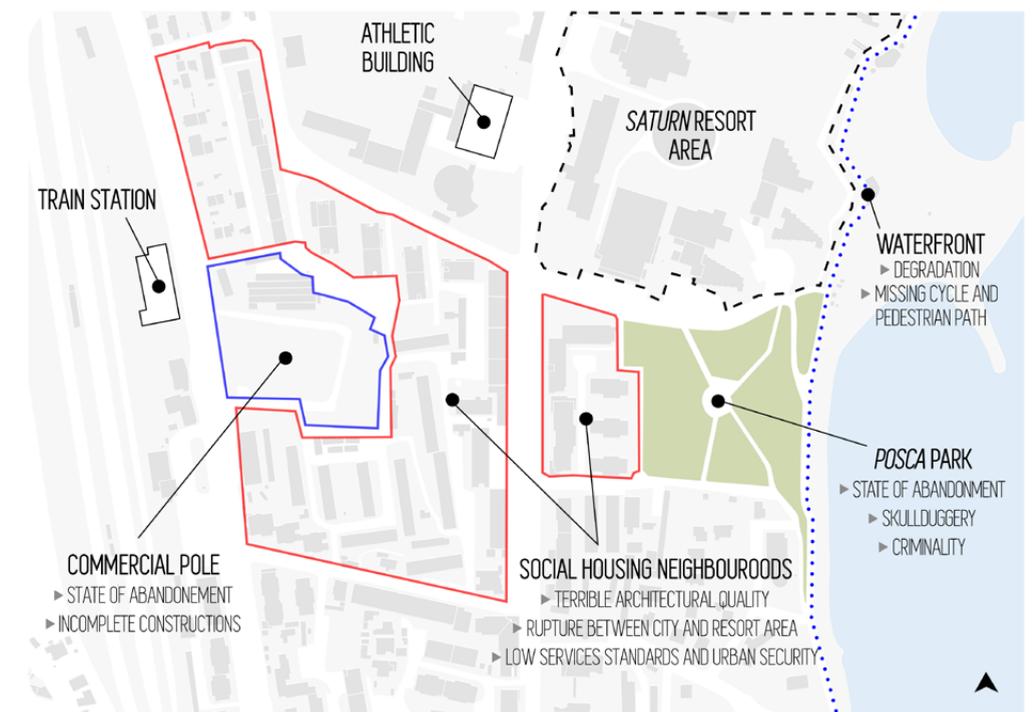
Fig. 138: At the top, the current state of the analysed social housing district and, at the bottom, the urban acupuncture project for its enhancement.

to the architectural-functional regeneration of the historical centre of Mangalia were considered of primary importance.

The first acupuncture project insists on the area of the archaeological museum. The area presents critical issues linked to a lack of coherence and proportion between the existing elements. The museum is very small, it is oppressed by neighbouring buildings and it is almost completely unused during the year, while archaeological excavations are in a profound state of degradation. There is an outdoor cinema, completely abandoned, while the massive Hotel Paradiso and the municipal stadium are incompatible with the context and the existing structures, and the waterfront has a low landscape quality and a functional inefficiency of the routes.

The intervention aims at recovering the forgotten Greco-Roman identity and enhancing the existing functions, creating a new recreational-museum pole, through a compositional redistribution of spaces and architectures, reconstructing pavilions that are in synergy with each other, redeveloping existing buildings and designing a green lung, a potential junction between green and blue infrastructure, which includes the renovated archaeological park, while the waterfront actually becomes the real urban waterfront.

One of the social housing neighbourhoods near the museum was chosen for the second acupuncture project. The architectural quality is very low, obstructing the continuity between the city and the ne-

arby area of the resorts, and a lack of services also persists; there is the construction site of a future commercial pole, now in a state of total abandonment. Moreover, in this area the waterfront is in a state of severe degradation, while the adjacent public park has become a hotbed of crime.

The purpose of the intervention is the valorisation of the neighbourhood, increasing both the architectural value and the standard of services, creating a buffer zone between the various functions: it is assumed that the residential area is integrated with parks and new services, redeveloping the buildings present; the completion of the commercial pole joins the recovery of the public park, where there will be recreational equipment and sport facilities, and the connection with the green infrastructure, guaranteeing a connection with the urban green infrastructure. Again, the retrofit of the waterfront recreates a more harmonious seafront.

In conclusion, the verification of the relationships between focal points, on which the urban acupuncture proposals operate, and the continuous networks of the green infrastructure has been explicit through the control of the functional transects: this action guarantees that the acupuncture projects developed correspond to the objectives set by the overall master plan, providing a key for evaluating the possible effect on the urban fabric.

The design methodology of the case study of Mangalia proposes

Fig. 140: View
towards the city of
the redevelopment
of the analysed
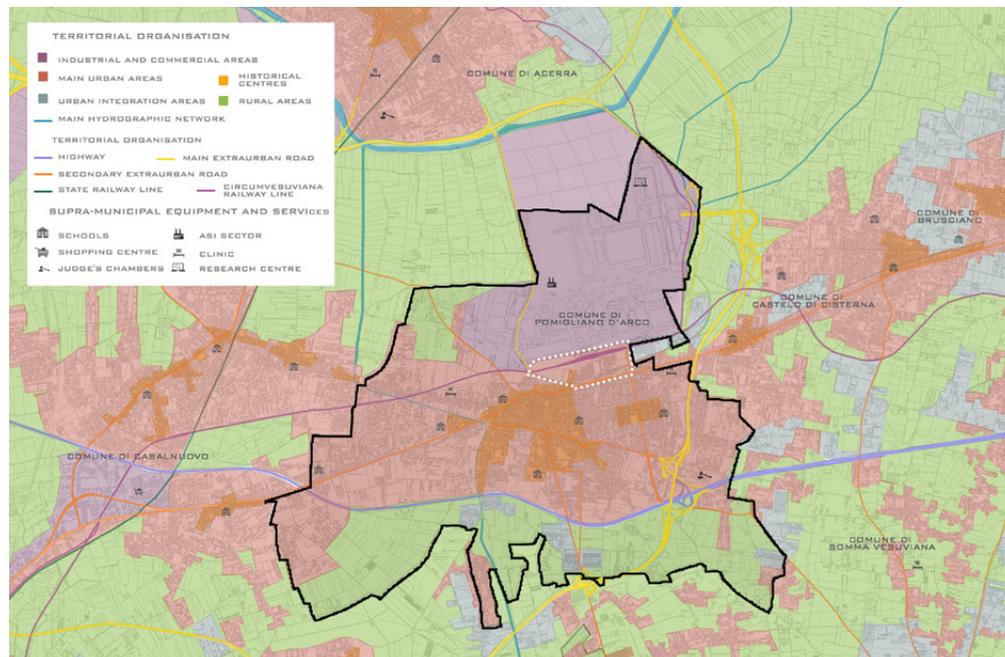social housing
neighbourhood.

40 Experimental thesis in Urban Planning and Landscape Architecture entitled "Green + SaferCity: Regeneration of the abandoned area of the former Circumvesuviana station in Pomigliano D'Arco" (Author: Granato T.; thesis advisors: Acierno A., Camilletti P.).

to redevelop the fragmented fabric of a medium-sized city that has seen its historical centre overturned, partially losing its identity memory and widening its limits with socialist residential districts and more recently with residential suburbs that are badly connected to the rest of the urban system. In the meantime, poorly used and degraded residual areas began to spread, requiring regeneration and revitalisation interventions. The richness of the existing natural resources (lakes and SCI areas) threatened by the urban growth allowed by the current land use plan calls for the design of a territorial and urban green infrastructure. Naturalistic necessities, the need for diversification of agricultural production and, finally, the regeneration of degraded fragments in the urban context have lent themselves to methodological experimentation which has provided satisfactory results, at least in urban planning and design.

Example 2 - Green + SaferCity: Regeneration of the disused railway area in Pomigliano D'Arco[40]

Fig. 141: Main elements of thePomigliano D'Arco's area.

Through the study of the Provincial Territorial Coordination Plan (*Piano Territoriale di Coordinamento Provinciale* - PTCP), Pomigliano D'Arco, a municipality in the province of Naples, appears to be a highly urbanised system and intimately linked to industrial deve-

lopment. In fact, it is characterised as a consolidated urban settlement, close to a historical branched nucleus, which is compared with a large area for productive settlements of supra-municipal interest in the northern part of the urban centre: this area includes the ASI sector (*Area di Sviluppo Industriale*) and its industrial poles.

A preliminary analysis phase highlighted the main elements of the city's networks. The municipal transport network connects Pomigliano to the neighbouring areas. The most relevant connection is the route of the Circumvesuviana railway line which cuts the city in half: in addition to relating the municipality to the nearby urban centres, it allows travellers to reach the provincial capital that is Napoli. Although there is no highway connection, the main road axis joins an extraurban road; the city has an internal network of local and neighbourhood streets. The pedestrian areas are limited, as are the current cycle track and footpath, both located on the perimeter of the industrial area.

Fig. 142: Territorial systems analysis.

Regarding the network of public accessibility and use, there are public facilities, especially near the historic centre, while the existing sports facilities occupy more decentralised positions; the regulatory car parks are located unevenly on the surface of the city which also has abandoned industrial areas in some more perimeter fringes.

Finally, the ecological and agricultural network presents a rural fabric widespread in the most peripheral areas, while parks and green areas find greater space in the city centre; there is also a river corridor along the western edges of the settlement core.

The case study concerns the abandoned area of the former Circumvesuviana station, between the northern industrial pole and the historic settlement centre. The area has undergone, over the past century, a progressive urban evolution that has gradually saturated the available land, also in conjunction with the progress of the main production plants. The area developed a rationalist character following the Cairoli Plan of 1939, in particular in relation to some

Fig. 143: The area is inserted in a concrete belt between the industrial area and the old railway tracks, creating a mosaic of waste spaces, defined SLOAP (space left over after planning), where the void becomes a space of exclusion and unsafety.

iconic buildings such as the former Circumvesuviana station itself, the municipal nursery and the residential area of the Palazzine. However, since it is a hinge-space between the inhabited centre and the industrial pole, this neighbourhood suffers from problems typical of the urban frontier territories, incorporating within it interstitial areas of poor function or identity: among the critical issues, we note the presence of physical barriers, as well as fragmentary urban shreds that flow towards the ASI sector; the presence of the railway track, in the southern area of the site, represents a critical element of urban and landscape discontinuity. On the other hand, among the local resources, there are green and agricultural areas that surround the intervention area, as well as the cycle and pedestrian path and some important historical emergencies.

The design methodology involves the creation of an articulated urban green infrastructure and an efficient security system: the goal is to realise a real *Green + Safer City*. In the security field, the crea-

tion of a system of indicators made it possible to analyse the physical location, to investigate the social structure and to understand the actual perception of security.

For the analysis of the physical place, the existing buildings and open spaces' prevalent uses were first studied, using space indicators. There are impermeable open spaces (railway track area), which are confronted with green open spaces, mainly in the heart of the neighbourhood: the latter are subdivided in reduced spaces with a rural vocation, mostly uncultivated flower beds and sports areas, in particular the municipal stadium; in the same central position there are residential buildings, while there are some public buildings on the margins, including the aforementioned municipal nursery, and commercial ones; moreover, the presence of brownfields was recorded, following the industrial decommissioning process.

The definition of a system of mobility indicators made it possible to draw up a distribution scheme of the routes which highlights how
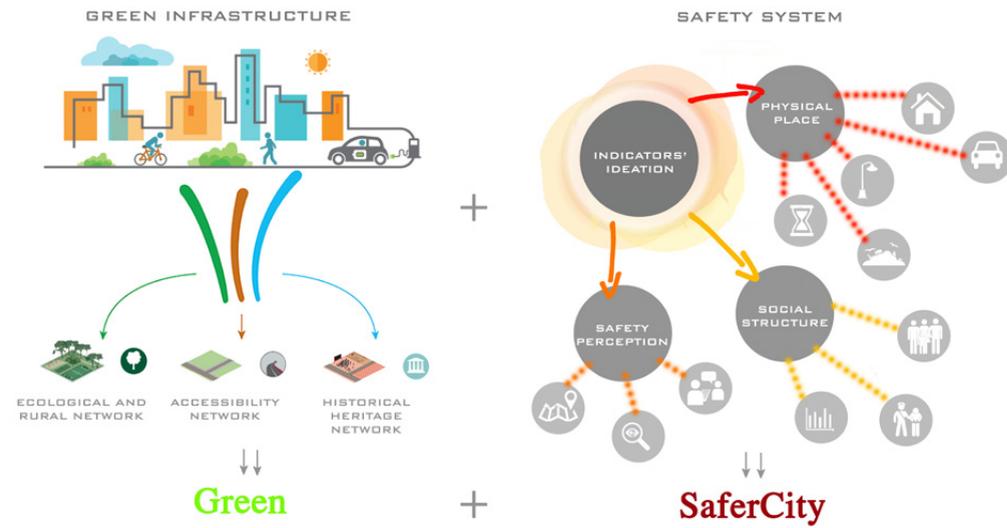
Fig. 144: Conceptual framework to describe the analytical methodology.

the main road system of Viale Impero and Via Roma cuts through the neighbourhood longitudinally, following the direction of the railway line, ensuring at the same time a transversal connection between the two axes through Viale Alfa Romeo. There is a cycle and pedestrian axis along the southern side of the site, while a system of secondary roads provide access to the blocks.

In relation also to the study of the existing routes, brightness indicators were developed. It emerges that the primary avenues are the only spaces with good or at least sufficient lighting, also thanks to private sources or commercial and sports functions; on the contrary, the innermost areas of the case study are poorly or not illu-

Fig. 145: Mobility distribution scheme of the case study.
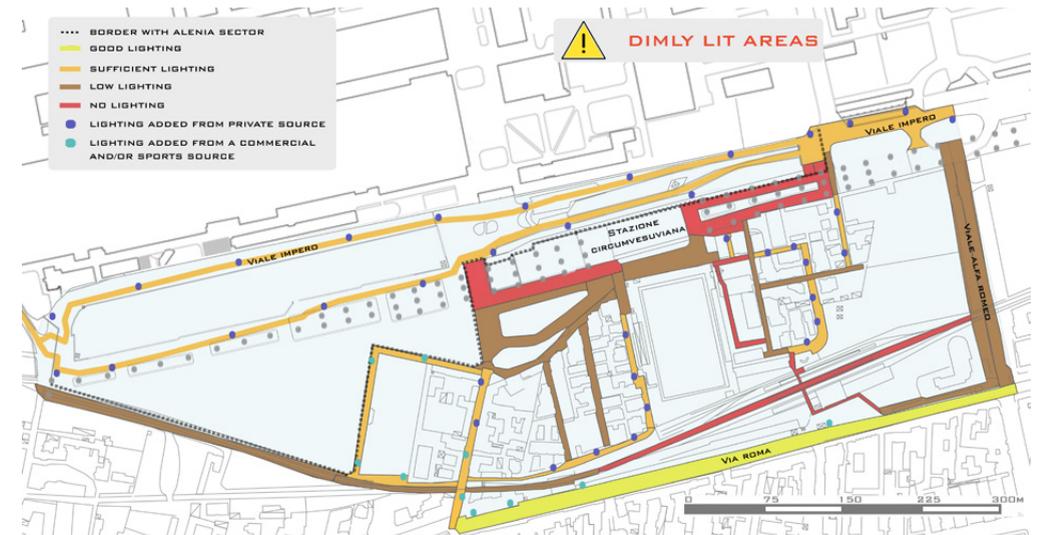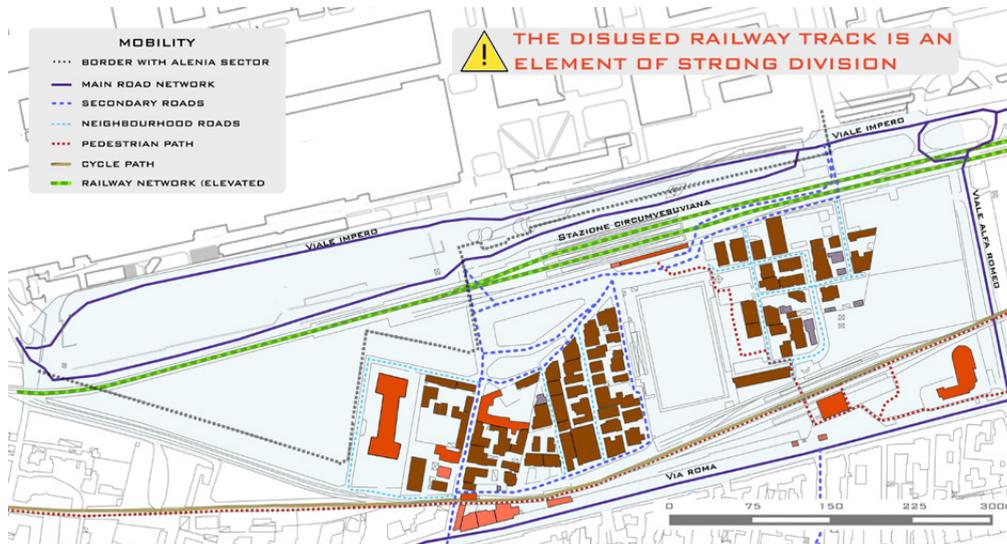
minated at all. These elements are complemented with the critical issues highlighted by the degradation indicators which, precisely in the central parts of the project area, reveal increases in volumes and illegal distortion of the built environment, the presence of waste and uncultivated greenery, graffiti on the walls and dilapidated facades. The analysis of times and flows of attendance, in relation to time indicators, then clarified the type of users of certain areas in relation to a certain time slot, detecting a more massive presence of commuters in daytime, while the subjects that are more exposed to the risk (Roma people, homeless, criminals) influence the use of the neighbourhood in the evening.

Fig. 146: The Pomigliano lighting study shows a general state of poor road visibility.

Fig. 147: The nocturnal analysis highlights the places of Pomigliano that are most sensitive to its critical issues.

Fig. 148:
Masterplan
for Pomigliano
D'Arco. The spatial
organisation and
the use of different
kinds of trees and
function define
the new green
infrastructure.

SPATIAL ORGANISATION AND SERVICE MANAGEMENT

SECTION A-A

PROJECT ELEMENTS
INDUSTRIAL BUILDING
RESIDENTIAL BUILDING
PUBLIC BUILDING

1. CIRCUMVESUVIANA STATION
2. LOCAL LIBRARY
3. URBAN PARK
4. MUNICIPAL NURSERY
5. MEMORIAL MUSEUM
6. NEIGHBOURHOOD MARKET
7. CENTRAL SQUARE
8. REPRESENTATION AREA
7. MULTIFUNCTIONAL BUILDINGS
10. ELEMENTARY SCHOOL
11. PANORAMIC AREA
12. URBAN GARDEN
13. SPORTS CENTRE

PROJECT TREES
PLATANUS ORIENTALIS   QUERCUS ILEX   FRAXINUS ORNUS   ARBUTUS UNEDO
POPULUS ALBA   ACER CAMPESTRE   CERCIS SILIQUATRUM   HIBISCUS SYRIANICUS

SECTION B-B

Fig. 149: Panoramic view of the project for Pomigliano D'Arco.

These sets of indicators came together in the analysis of the social structure of Pomigliano d'Arco, providing a report on both social morphologies and local crime. It should be noted that the city is composed for the most part of permanent residents and commuters, in relation with the urban functions, both in working age and in school age, while a smaller percentage is covered by specific city users and risk categories.

The places that form the background to the crimes are the station and the cycle path, followed by the pedestrian path and the parking space in the western part of the neighbourhood; the main streets, Viale Impero and Via Roma appear safer. The most committed crime appears to be robbery and mugging, in addition to drug dealing and physical attacks, while the main form of surveillance is mechanical; on the contrary, informal control appears to be weaker.

To find the aforementioned information, interviews were carried out aiming at different types of stakeholders, such as officers of the law, residents and drivers of public transport; this added to thematic observations at various times of the week and time slots to detect the presence and frequency of criminal episodes and safety walks, or exploratory walks with a group of local escorts aimed at drawing up a summary map of sensitive places and critical issues, which highlighted the actual perception of safety: following a nocturnal analysis, it became clear that the area with low security is the one between the industrial centre and the sparse residential blocks, which instead are on average safe places; on the contrary, the inter-stitial spaces between the residences are considered totally insecure, with particular criticality in conjunction with the pedestrian path that crosses them.

Regarding the creation of the green infrastructure, it was hypothesised to put several networks in the system. First of all, the slow mobility network provides for a more efficient cycle and pedestrian path that crosses the neighbourhood, relating it to the surrounding areas, alongside a new system of nature trails; a new project road is added to the existing main and secondary ones in order to provide a better accessibility to the blocks and main places of the site.

The new ecological network aims to create a new green corridor on the footprint of the disused railway tracks, alongside a system of green areas and project squares to saturate the urban voids of the study area; among the new centralities, it is also hypothesised to design an urban park, between the residential lots and the transverse axis of Viale Alfa Romeo.

The project accessibility and fruition network has the aim of recovering buildings from the aforementioned Cairoli Plan, considered to be historical-architectural heritage, through a re-functionalisation, thus integrating the existing facilities network; the urban texture will be restored through the functional *mixité*, guaranteed by the creation of new buildings that will positively fill the interstitial spaces, especially around the residential area of the site; at the same time, the redevelopment of the facades of the architectures on Via Roma will ensure an improvement in the quality of the relevant road axis.

Fig. 150: View of the project for the central square.

Finally, the rural network aims to create a system of neighbourhood urban gardens in a more decentralised position, in addition to allocating new spaces in the centre of the study area for a market function.

The implementation of the green infrastructure is accompanied by the project safety system which provides, for the most critical areas, a new street lighting system in order to improve the visibility of pedestrians, video surveillance systems at strategic points and information kiosks alongside adequate integration of signage.

The intervention, therefore, allows a more valid urban design that considers the critical issues and the analysed resources, ensuring a balance between industrial, residential and public buildings, as well as implementing a more efficient urban green design, with the inclusion of specific tree species, and generating new attraction poles. Among the latter, significant is the new square, in the heart of the study area, which aims to increase social encounters and vitality, reconnecting the station with the urban fabric with the task of allowing the city to function as an integrated system. Equally spatially central and socially relevant is the new urban park: this area has a purely naturalistic character; the arrangement of an adequate system of trees and artificial lakes configures it as a meditative space; the flow of slow mobility guarantees the presence of dynamic 'eyes on the street' which constitutes an important and precious deterrent

Fig. 151: View of the project for the urban park.

for criminal behaviour.

The design process also followed the criteria of the UNI CEN TR. 14383-2 Standard, related to crime prevention through urban planning, in relation specifically to Annex D. Private views of buildings are established as close as possible to streets and public places as well as services and public-cultural activities are introduced on the ground floor of buildings with semi-transparent accesses; added to this is the good visibility of the open spaces, thanks to tall trees that do not offer hiding places for any attackers and to a clear orientation for pedestrians which reduces anxiety and vulnerability of the latter. These measures discourage illegal attitudes by reducing crime. The external spaces allow good accessibility both to civilians and to security or rescue bodies; together with appropriate video surveillance systems, the improved street lighting, guaranteed not only by street lamps but also by shop windows and other private sources, guarantees safer practicability and significantly increases visibility. In the same way, the inclusion of a more efficient pedestrian path increases vitality for the benefit of the riskiest areas as well as critical nodes such as public transport stops, which are notoriously vulnerable because they are often isolated. Regular maintenance also promotes a sense of security, preventing the devaluation of spaces preceding vandalism and degradation situations: for this reason, it is important to establish appropriate guidelines to regulate the use of public spaces. However,

41 For more information, see the website https://www.coland.eu/

urban planning must include residential buildings with different sizes and costs for avoiding social exclusion and gentrification, favouring the presence of a heterogeneous population.

The integration of the open spaces' design and the improvement of urban safety takes into consideration existing social and physical structures, eliminating physical barriers and residual spaces, as well as ensuring accessibility. The concept of monothematic areas is overcome thanks to the functional diversification, creating an adequate urban density. The quality of life and urban spaces improves thanks to an urban project that amplifies the potential of the places, creating new centralities and suitably integrating the different networks that underlie the sustainable and positive development of the city, protecting its environmental, historical-cultural and social characteristics. In this way, it is, therefore, possible to pursue the goal of creating a *Green + Safer City*.

Example 3 - Green and Blue Infrastructure for the Phlegraean Fields: the Erasmus+ Project CO-LAND

Fig. 152: List of the partners involved in the CO-LAND project all over Europe.

The proposed approach was initially launched, and subsequently developed in the field of personal research, within the Erasmus+ Co-Land project 'Inclusive coastal landscapes: activating green and blue infrastructure for the sustainable development of the urban-land in-
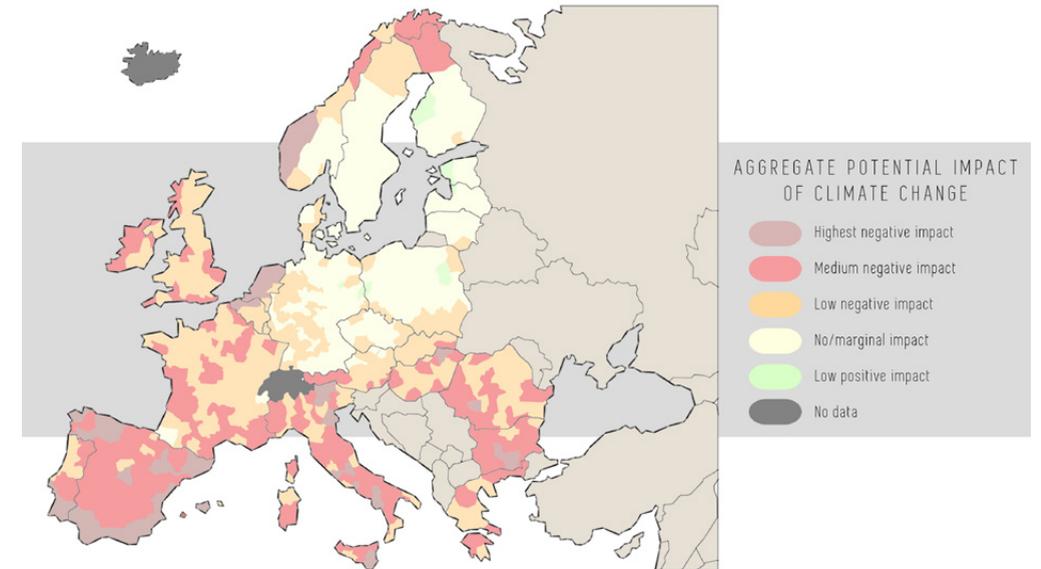

AGGREGATE POTENTIAL IMPACT OF CLIMATE CHANGE

- Highest negative impact
- Medium negative impact
- Low negative impact
- No/marginal impact
- Low positive impact
- No data

terface'.[41]

The Co-Land project involves a broad partnership of seven European universities (IUAU - Ion Mincu University for Architecture and Urbanism in Bucharest; the two German universities of HfWU Nürtingen-Geislingen University of Applied Sciences and HSWT Weihenstephan-Triesdorf University of Applied Sciences; EMU Estonian University of Life Sciences of Tartu in Estonia; ULB Université Libre de Bruxelles in Belgium; University Federico II of Naples in Italy; and Ovidius University of Constanta in Romania) and two Industry Associations (ISOCARP International Society of City and Regional Planners; LE: NOTRE Institute -European landscape architecture network). The Co-Land project aims to develop innovative teaching based on new communication technologies in order to integrate training methods and experiences from different European countries. The object of the research/teaching experience is the efficient planning of green-blue infrastructures in the European coastal areas, mainly within the disciplinary sectors of urban planning and landscape architecture. The three-year project develops online courses for international students, four workshops in different European coastal regions (Mangalia on the Black Sea, Tallinn on the Baltic Sea, De Panne on the North Sea, Phlegraean Fields on the Mediterranean Sea) and a manual about the good design of green infrastructure in coastal areas.

The teaching procedure includes an initial six-month online course which is mainly composed of two phases. The first phase consists of twelve theoretical lessons aimed at providing multidisciplinary methodological tools through online conferences: the teachers,

Fig. 153: The impact of climate change on European countires, one of the most relevant issues influencing the coastal landscape (source: IRPUD, ESPON, Climate Project, 2011).

42 The documents on the Wiki platform can be visited at https://colandwiki.hfwu.de/index.php?title=Main_Page

coming from the aforementioned institutions, jointly participate to interactively and dynamically involve students of inter-European universities. The latter have the task of developing a graphic and analytical report on the coastal area closest to them, applying the previously learned concepts: the project, which is produced gradually following a pre-established order of objectives, implies a periodic comparison within multinational groups. The second phase consists of an intensive workshop in a European coastal city: the groups of the various universities involved in the previous phase cooperate to develop a project related to the coast similar to the one produced on their national study areas.

The progress of the studies during both phases is progressively reported on a specific Wiki platform,[42] designed to make the results of the entire work available to anyone who is interested.

Above all the coastal areas, consisting of a mosaic of natural and rural spaces often marked by a dense hydrographic network (blue network) and fragmented in functional and physical conformation, lend themselves to the design of green-blue infrastructures capable of ecologically reconnecting the territory and giving consistency to the different activities as well as providing ecosystem services. Green infrastructures are also born to face hydraulic risk that particularly affects the coastal areas, pressed by the floods of the torrential/fluvial

Fig. 154: Elements of green infrastructure in the Phlegraean Fields to be connected.

Miseno beach

Solfatara

Monte Nuovo

- Phlegraean Fields Regional Park
- SCI areas

Environmental resources

Regional Parks   Nature 2000 Network   Valuable agricultural areas   Coastal areas

waters and by coastal erosion. The awareness of the complex but delicate relationships between the landscape features and their fundamental implications in the socio-economic life of human settlements has, therefore, shed light on the need to create a shared awareness that could be concretely translated into a design approach.

The second online course was held in spring 2019 and it preceded the 10-day intensive study programme in Pozzuoli (some 70,000 inhabitants). The unique landscape of the Phlegraean Fields offers the chance to investigate a multi-layered coastal area where the dense urbanisation coexists with rare environmental phenomena (vulcanism), nature values, a remarkable cultural and historical heritage and a strategic infrastructural role. This was the second intensive study programme in cooperation with ISOCARP, the LE:NOTRE Institute and the Municipality of Pozzuoli.

The Phlegraean Fields are characterised by a landscape dynamism between natural phenomena and anthropic factors, and this kind of interaction has recently produced a heavy alteration of landscape identity that is linked to the volcanism and the historical component. The area is in fact well known for its peculiar land morphology, mainly shaped by the intense volcanism. It has created several landmarks and it is still active in secondary events such as Pozzuoli's

Fig. 155: Satellite view of the Phlegraean Fields. The impact of urban sprawl on the territory is evident (source: Google Earth).

Fig. 156: View from *Rione Terra*, the historical centre of Pozzuoli where the Intensive Study Programme was held.

Fig. 157: Aerial perspective of the Licola Nature Reserve along Phlegraean coast and Fusaro, Lucrino and Averno lakes. (source: http://www.freebacoli.net/tag/campi-flegrei/).

Solfatara and the springs of Agnano's Baths. Moreover, since ancient times, the identity of the Phlegraean Fields is strongly connected with cultural heritage and archaeological ruins that have not shown alterations as the ones that occurred in Rome during the Late Antiquity and the Middle Ages, but only a process of natural ageing and the consequences of volcanic phenomena.

Unfortunately, the current image denotes the subordination of natural and historical components to the anthropic transformations: nowadays, the ecosystem is highly degraded and fragmented, requi-

ring effective tools and actions to recover. There would be a great benefit from innovative tools such as green infrastructures in order to implement ecosystem services and biodiversity.

Despite the chaotic urban sprawl, which may threaten the very existence of the environmental and cultural heritage, it is still possible to observe stunning volcanic and water landscapes, unique tufa cliffs, huge Roman cisterns and other monuments, besides the local botanical richness and Mediterranean scrub. The three main archaeological settlements of Cuma, Puteoli-Pozzuoli, and Baia-Bacoli-Miseno are located in the three most representative Phlegraean municipalities (Pozzuoli, Bacoli, and Monte di Procida), but each cultural park is not necessarily fully comprised in one territory. Such circumstances, together with the overall geomorphological features, contribute to envisage an overall district concept of the area rather than individual development proposals.

For this reason, the intensive study programme built upon subject-specific knowledge presented in the online course that has preceded this workshop, creating different teams in relation with different study areas.

The learners focussed on understanding coastal landscapes through the driving forces, challenges and processes that characterise the coastal system; the course also took into consideration the evaluation and the assessment of the economic, ecological and social dimension. According to the ideals of integrated urban design, the task was a strategy and spatial plan for sustainable development integrated with international and local policies for the coastal area.

The participants were challenged to learn two sets of competences. In relation to *social and personal abilities*, they identified a change potential based on a critical reflection of structures, conditions and dependencies with respect to the local context and culture, actively participating in an interdisciplinary process-oriented planning and design process and describe their own value schemes and interpretation patterns. With respect to *methodological skills*, Participants acquired relevant knowledge and information independently, evaluating, analysing and processing this knowledge information for designing a working process in a target-oriented way, applying planning and project management methods to a new context and communicating results to different types of audiences (subject-specific and general public).

The process was structured around the various major activities. First of all, the workshop aimed at identifying local potentials by applying a holistic landscape assessment framework, using the green-

Fig. 158: "A visual strategy for Baia" – masterplan. One of the project elaborated during the workshop (Antonietta Miraldi, Denisa Lungu, Luis Aquino, Mariana Cairo, Sudara Jayalath, Ali Amrita).

Fig. 160: The cultural transect (elaborated by Antonietta Miraldi, Denisa Lungu, Luis Aquino, Mariana Cairo, Sudara Jayalath, Ali Amrita).
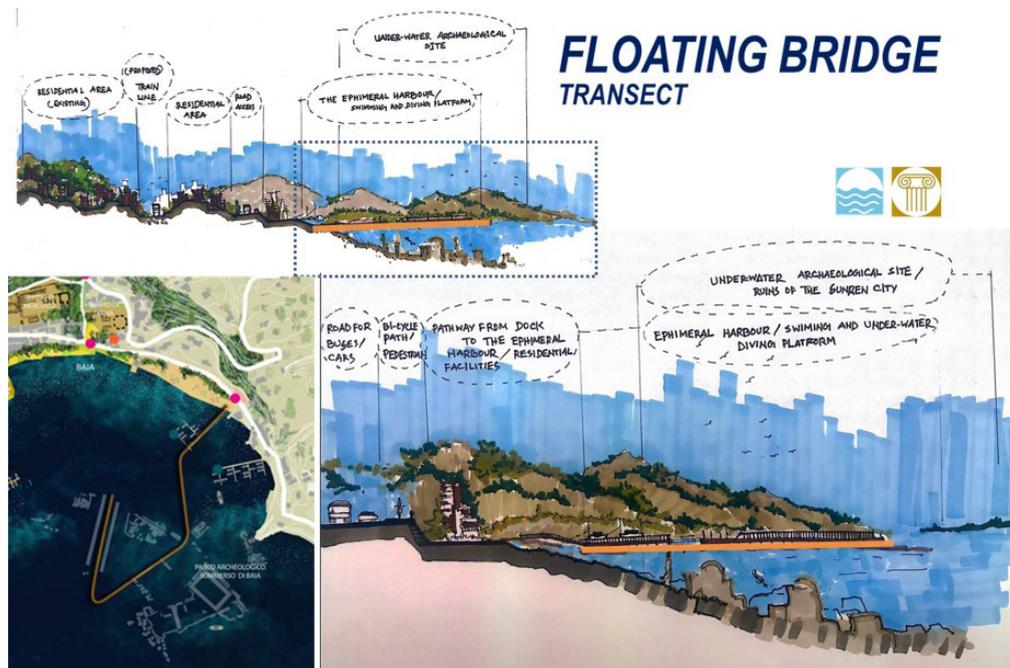

Fig. 159: One of the developed transects (elaborated by Antonietta Miraldi, Denisa Lungu, Luis Aquino, Mariana Cairo, Sudara Jayalath, Ali Amrita).
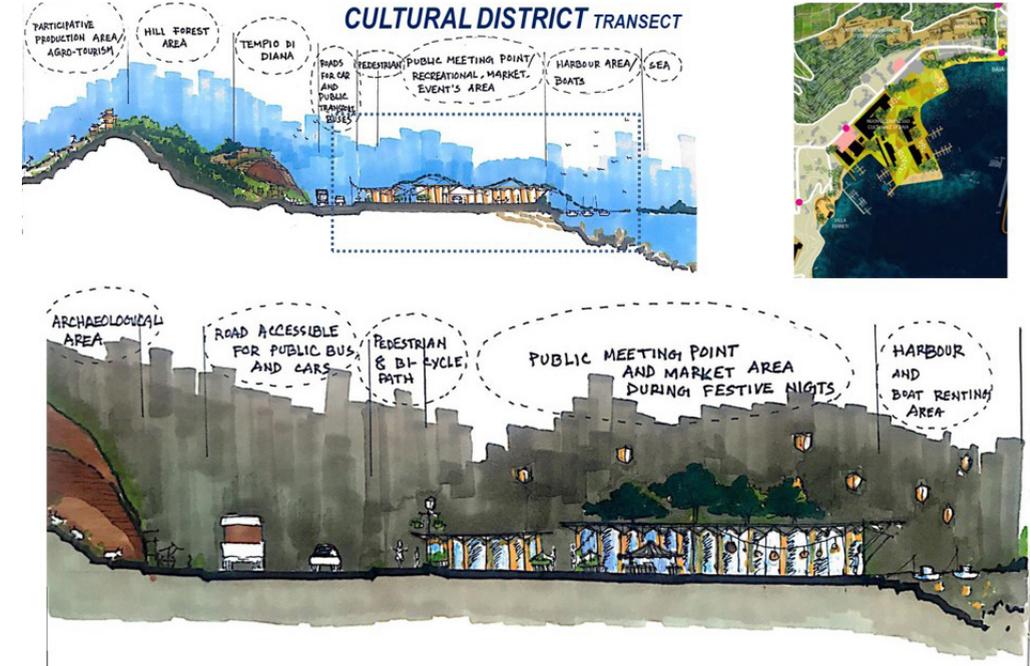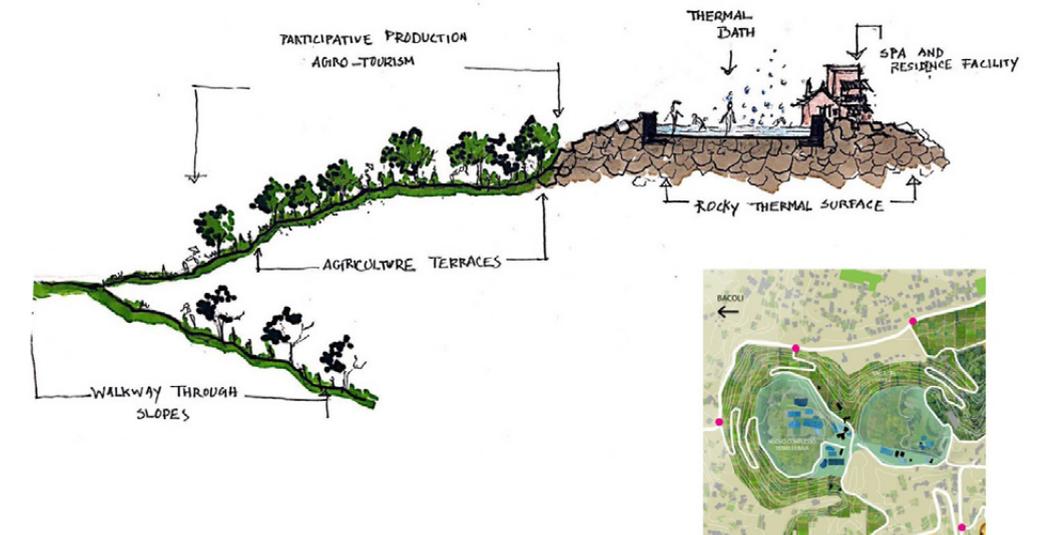

Fig. 161: Another transect for Baia (elaborated by Antonietta Miraldi, Denisa Lungu, Luis Aquino, Mariana Cairo, Sudara Jayalath, Ali Amrita).

Baia promenade and Cultural District

Public park / beach along the shoreline

Fig. 162: Details of cultural transect for Baia (elaborated by Antonietta Miraldi, Denisa Lungu, Luis Aquino, Mariana Cairo, Sudara Jayalath, Ali Amrita).

blue infrastructure approach to improve connectivity and multi-functionality of fragmented and competing spatial layers and structures. Consequently, the groups used people-centred and community-based evaluation, planning and design methods, applying scenario techniques for envisioning alternative futures and discussing these ideas with the local community through innovative communication and visualisation tools. Documented outcomes of the course were intended to become a basis for further local discussions and processes.

The CO-LAND intensive study programme considers green infrastructure as a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services such as water purification, air quality, space for recreation and climate mitigation and adaptation. This network of green (land) and blue (water) spaces

Fig. 163: "Terra d'acqua" – conceptual vision for the Lake Averno's area (elaborated by Asif Adnan, Virginia Cuneo, Lubna Mansour, Bianca Ivascu, Helene-Terese Jürgenson, Alexandra Lungu, Bruna Spagnol).
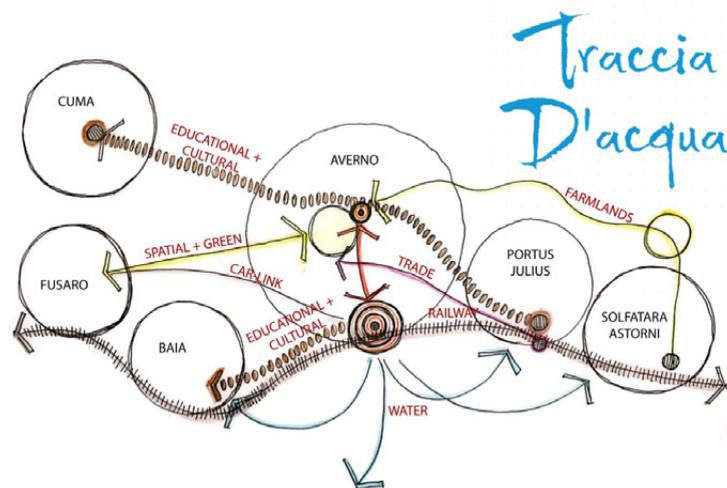
Priority Areas
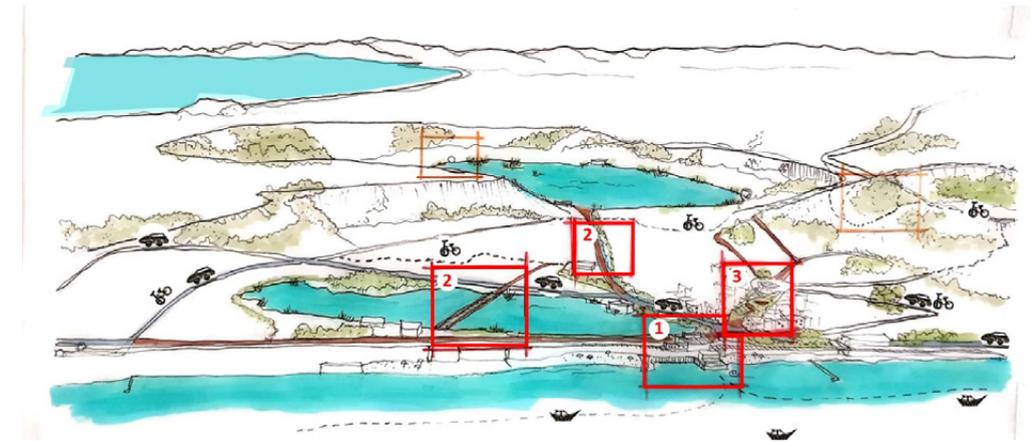
can improve environmental conditions and, therefore, impact on citizens' health and quality of life, supporting a green economy, creating job opportunities and enhancing biodiversity. The Natura 2000 network constitutes in fact the backbone of the EU green infrastructure.

Thus, ensuring the connectivity, validation, protection and multi-functionality of Phlegraean green network bears enormous potential for the area and is also a major strategic goal already adopted by the municipality as part of its development strategy. This topic should be combined with the conception of a hiking and cycling network for sustainable transport. The green infrastructure network could further support the connectivity and accessibility of local heritage areas. Combining ecological, social and economic benefits by an overarching green infrastructure strategy can build a powerful framework for joining the forces of different actors and interest groups working towards a common goal. For this reason, green and blue infrastructure served as the guiding principle for the working groups.

The different teams studied the areas, elaborating analytic studies in order to design complementary portions of the overall Phlegraean green network. Thanks to the urban-to-rural transect approach, it was possible to analyse significant sections of the territory, studying the connections between consequents spaces of the site, ensuring a valid relationship between anthropic and natural aspects. The use of urban acupuncture was fundamental to design localised regenerative transformations, providing a progressive benefit in the surrounding areas, combining knowledge from different scientific research fields (architecture, urban planning, geography, etc.).

In conclusion, the ERASMUS+ strategic partnership 'COLAND – Inclusive Coastal Landscapes' is developing an innovative study mo-

Fig. 164: Averno's most relevant areas of intervention (elaborated by Asif Adnan, Virginia Cuneo, Lubna Mansour, Bianca Ivascu, Helene-Terese Jürgenson, Alexandra Lungu, Bruna Spagnol).

1. Intermodality Hub

Pedestrian gallery between Lake Lucrino and the intermodality station

Section of the intermodality station: underground tunnel, rooftop lookout

Terrazza panoramica

Spiaggia libera   Spazio condiviso   Sedute

2. Shared Spaces

Shared space connecting to Averno

Connecting wooden bridge over lake Lucrino

3. New Gate to Monte Nuovo

Wooden lookout and improved pathway at Monte Nuovo

Section of the new Monte Nuovo entrance: stairway to the square and street profile

Fig. 165: Details of Lake Averno project intervention (elaborated by Asif Adnan, Virginia Cuneo, Lubna Mansour, Bianca Ivascu, Helene-Terese Jürgenson, Alexandra Lungu, Bruna Spagnol).

dule by combining online and site-based learning activities. In light of the sensitive nature of coastal landscapes and their relevance to society, economy and the environment, it is vital that planners and designers learn how to manage these territories in a sustainable way. Course participants developed a profound understanding of the specific character of coastal landscapes, learning which driving forces are influencing the landscape system and which impact types are most relevant for planning and design responses. Participants learnt about

Fig. 166: Cuma's spatial-temporal vision (elaborated by Antonio Leone, Monica Amuza, Maria Iuca, Mihaela Adam, Penpichcha Saiwilai, Rana Shukayr).
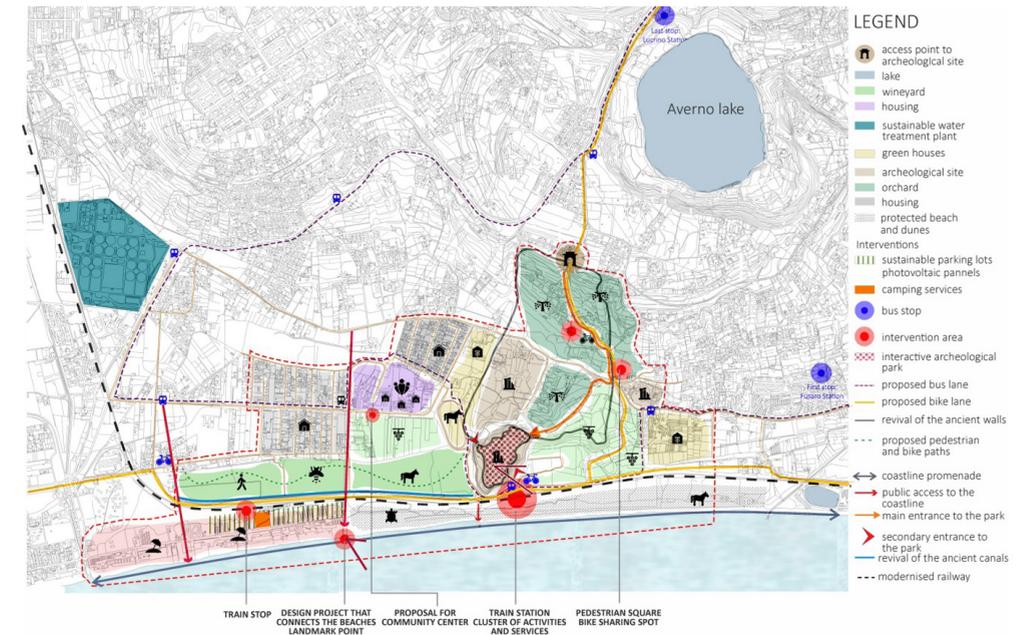
Priority area 1 - achiving goal no 1
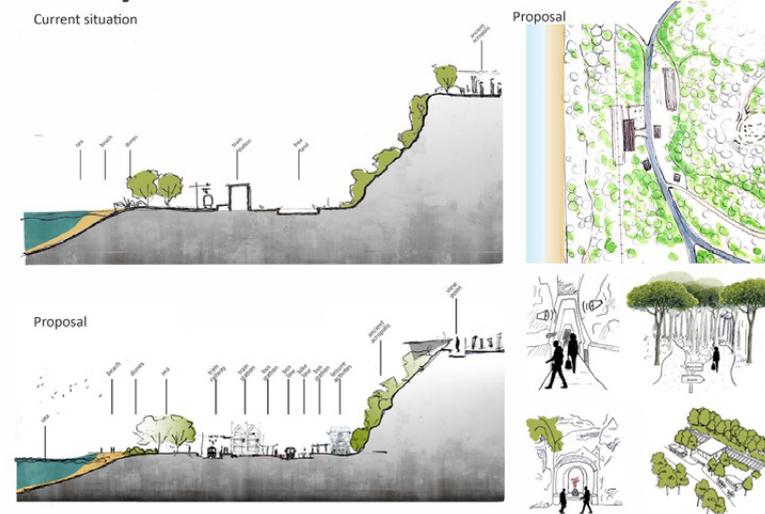
Fig. 167: Detail of Cuma's project intervention with a comparison between current and future situation (elaborated by Antonio Leone, Monica Amuza, Maria Iuca, Mihaela Adam, Penpichcha Saiwilai, Rana Shukayr).

Fig. 168: Detail of Cuma's project intervention with a comparison between current and future situation (elaborated by Antonio Leone, Monica Amuza, Maria Iuca, Mihaela Adam, Penpichcha Saiwilai, Rana Shukayr).

various approaches to landscape assessment in order to specify the

Fig. 169: Detail of Cuma's project intervention with a comparison between current and future situation (elaborated by Antonio Leone, Monica Amuza, Maria Iuca, Mihaela Adam, Penpichcha Saiwilai, Rana Shukayr).

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challenges and potentials of a coastal landscape, defining and testing assessment models, and derive relevant knowledge for planning and design, such as the introduction of green-blue infrastructures in coastal landscapes and their punctual application through urban acupuncture. The final objective is to teach how to draft a strategy and a masterplan for a coastal area taking economic, ecological and social aspects and current policies into account.

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The chapters 1, 3 and 5 of this book propose, with adjustments and updating, some texts that have been already published, which are listed below.

A multi-scalar design proposal: s-RGB (safe - Regenerative Green Blue) Design for contemporary city, paper presented to the 3rd ICAUD International Conference in Architecture and Urban Design, Epoka University, Tirana, Albania, 24-26 October 2019.

Un approccio integrato per la pianificazione urbana multiscalare, in TRIA 21 (2/2018), FedOA Press, Napoli, 2018.

Paesaggi inclusivi e urbanistica ecologica: infrastrutture verdi e servizi ecosistemici, in TRIA 20 (1/2018), FedOA Press, Napoli, 2018.

La pianificazione "antifragile" per il sistema dei trasporti: l'applicazione del geodesign come strumento operativo, in BDC V. 18 N. 1 (2018), FedOA Press, Napoli, 2018

Engendering Habitat III: Facing the Global Challenges in Cities, in TRIA 17 (2/2016), FedOA Press, Napoli, 2016.

Riempire i vuoti con le infrastrutture verdi, in TRIA 14 (1/2015), FedOA Press, Napoli, 2015.

La visione sistemica complessa e il milieu locale per affrontare le sfide della resilienza, in TRIA 15 (2/2015), FedOA Press, Napoli, 2015.

Urbanistica securitaria: modelli, limiti e nuove prospettive di ricerca, in TRIA 5 (2010), FedOA Press, Napoli, 2010.

The ecological approach to urbanism recently became a main interest in the international disciplinary debate, in response to new social demands: climate change, reduction of natural resources, regeneration of urban abandoned land, perception of unsafety in public space call for changing approach to territory development. The book focuses on the "multi-scalar design", a practice able to act on open spaces, ecological networks and green infrastructures but also on regeneration of the urban organism's neuralgic parts. The book supports a proposal that integrates the territorial vision offered by the green-blue infrastructures with the regeneration of disused and abandoned urban spaces applying recent tools such as urban acupuncture or tactical urbanism, the latter ones revisited according to a design and participatory perspective.Moreover, the perception of unsafety of public spaces is rising as a focal problem for urban policies. Therefore, the methodological design proposal is completed giving specific attention to recent guidelines for urban safety design.

The idea of joining these approaches at different levels, from territorial to micro-urban ones, is defined the "s-RGB Design" (safe Regeneration and Green Blue Design).

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