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AUTHOR: VITTORIA MENCARINI
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Landscape ecological urbanism: effective strategy for resilient cities

How can landscape design be integrated in urban planning, reshaping urbanity and creating a new scenery? Strategic Proposal for the city of Prishtina

Keywords / Landscape, Ecology, Urbanism, Resilience, Climate Change

Vittoria Mencarini

PhD researcher / Ferrara University

Abstract

The objective of the contribution is to understand how landscape design can be integrated in the urban planning, through a multiscalar approach able to remodel the city, and by creating a new urban scenery that comes from the territorial and cultural uniqueness of the intervention's context, being at the same time able to fulfil the global challenges (for example, how cities adapt to climate changes) that contemporary cities are called upon to give urgent answers to, in terms of urban resilience's improvement through actions of adaptation and mitigation. The present debate on the settlement of agreements, guidelines and Best Management Practices to reduce the negative relapses of the anthropic development orients the strategies of redesigning cities starting with the integration of landscape ecological design in the urbanized space's planning. The goal is to avoid, minimize and better manage the environmental impacts brought by urbanization, following a process of sustainable planning and guarding the ecology and the specificities of the landscape, in response to the goals established by international agreements. This consciousness makes us orient the debate towards the possible overlap and application of means offered by the guidelines of international programs, shared and well-established, and towards seeing Prishtina as an ecological and resilient city with the aim to becoming a new capital of Europe. Generally speaking, the actions involved that can have positive incomes regarding the ability to create a synergic and symbiotic relation between man-made and natural space. Specifically speaking, these actions can be translated into: restraining the urban expansion, protecting the natural resources (air and water), protecting and implementing biodiversity, reducing the soils consumption, restraining the environmental risk factors (landslides, flood), improving the environmental quality and the urban microclimate (reduction of the UHI phenomenon).

Starting with some considerations on many international cases of land and city management, European directives, integrated landscape ecology urbanism planning, and green-blue infrastructures' design, the focus is on the chances of intervention in the city of Prishtina, in relation to the recent allocation of an instrument of national planning that requires the definition of a far-sighted urban plan that is able to compare Prishtina to the other European capital cities. Today Prishtina gives us a chaotic and fragmented picture of itself. Its present, unresolved condition of chaos is creating considerations about the image of the city to be approved in the European confrontation. A study on the possibilities for Prishtina to delineate strategic actions is to increase the urban resilience emerged, facing the high level of pollution and congestion of a city that had an important urban growth without a planning. Starting from here, we have evaluations on the importance of healing what's there and developing new connections, on the principle of a reduced environmental impact, able to connect the fragments into a framework. It will be essential to pursue an integrated approach between territorial, urban and architectonic scales, with specific interventions in the urban tissue, able to build step by step a picture of Prishtina as a new European capital city, with an improved environmental welfare and life quality.

Preamble: Resilient cities as a new paradigm for planning human habitat in the Anthropocene Era

The world's level of sustainability in the 21st century depends for the most part on the level of sustainability of the cities and on the land management, understood as a symbiotic ecosystem able to have osmotic relations with the contest. Today, global warming is widely studied and debated in the scientific community because of its many implications on the environment, the ecosystems and the life of every living thing. Important climate variations and consequent alarming and catastrophic events are strictly connected to global warming.

The studies have been focusing on this topic for at least thirty years, and now it is widely known as a problem of political interest, because of the catastrophic implication that it is already generating in economic and social terms. The problem is of a global concern, and as such it must be faced on a global scale, acting on the causes and finding solutions to fight and attenuate it. Climate changes have always existed, linked to natural causes, but now they're happening a lot quicker than what humans have experienced in their history, and related to anthropic activity (Folke, Berkes and Colding, 2003)¹.

Tab1. Risks related to climate change²

Tab2. Main influence factors on climate change linked to the anthropic action³

From this perspective, urban planners are beginning to look into different

aspects of urban climatic parameters and principle of landscape ecology, and to incorporate them and the so called geography of the risk as the design parameters, so that the urban settlements return to have a physical and functional connection with their own territorial context. The goal is to combat the causes of the phenomenon (mitigation)⁴, but also reorganizing to reduce our vulnerability to the risk factors (adaptation). Here comes into play the concept of urban resilience⁵, the new paradigm for planning human habitat in the Anthropocene era.

Fig1.Green Resilience: Adaptation + Mitigation Synergies⁶

The ability to adapt and to change shape depends also on the ability to translate political intentions into concrete project actions, capable to find an answer to the problem on many different scales of intervention⁷. Given the complexity of the problem, what's required is a multidisciplinary approach in which various professionals can systematize skills from different sectors to find local answers to global problems.

This synthesis is important, given the global trends in urbanization, population growth, climate change, energy use, and water availability finding integration of different scales of restoration planning and design and the establishment of long-term monitoring and adaptive management. Architects, landscapers, planners, civil and environmental engineers maintain

¹ / Berkes, F., Colding, J., Folke, C., (2003) *Navigating social-ecological systems: Building resilience for complexity and change*. Cambridge: Cambridge University Press

² / Source: elaborated by the author from Mastrodonardo, L., Manigrasso, M., (2014) *A.R.M.I. Adattamento Resilienza Metabolismo Intelligenza*. Gorizia: EdicomEdizioni

³ / Ibid.

⁴ / *Adaptation and mitigation options by IPCC (Intergovernmental Panel on Climate Change) https://www.ipcc.ch/publications_and_data/ar4/syr/en/spms4.html*

⁵ / *Resilience is the capacity of a social-ecological system to absorb or withstand perturbations and other stressors such that the system remains within the same regime, essentially maintaining its structure and functions. It describes the degree to which the system is capable of self-organization, learning and adaptation (Holling 1973, Gunderson & Holling 2002, Walker et al. 2004)*

⁶ / (Source: elaborated by the author from <https://www.ctc-n.org/calendar/webinars/ctcnccap-webinar-green-resilience-adaptation-mitigation-synergies>)

⁷ / *Recent studies have defined a set of seven principles that have been identified for building resilience and sustaining ecosystem services in social-ecological systems, such as: maintaining diversity and redundancy, managing connectivity, managing slow variables and feedbacks, fostering complex adaptive systems thinking, encouraging learning, broadening participation, and promoting polycentric governance systems (Biggs et al. 2012). by Resilience Alliance: <https://www.resalliance.org/resilience>*

VARIATION LINKED TO CLIMATE CHANGE	PROBLEM/RISK	TEMPORAL PROJECTION
Spatial and temporal distribution and intensity of precipitation and change of wind structure	Drought and Desertification in some areas Floods, Tsunami	Medium/long term Short term
Elevation of sea level	Coastal erosion	Long term
Increased temperature of the atmosphere	. Increased temperature and CO2 level and variation of salinity in the oceans with consequences on marine and terrestrial ecosystems. . Heate wave – cyclon – fire . Melting glaciers	Medium/long term Short term Medium/long term

Tab.1 / Risks related to climate change

MAIN INFLUENCE FACTORS ON CLIMATIC CHANGE LINKED TO THE ANTHROPICAL ACTION		
CAUSES	CONSEQUENCE	ROLE
Deforestation	Radiative Forcing ²	Passive negative
Agriculture	Radiative Forcing	
Climatizing gas emission	Greenhouse effect	Active negative
Energy production	Greenhouse effect	
Urban settlement	Urban shape: - Albedo effect - Urban Heat Island - Urban canyon effect	
	Artificially waterproof areas: - Acceleration in water conveying (Increase in surface runoff and at the same time reduce delay time) - Increased volumes of water to the manifold (sewer / gray infrastructure)	

Tab.2 / Main influence factors on climate change linked to the anthropic action

Green Resilience ADAPTATION+MITIGATION SYNERGIES

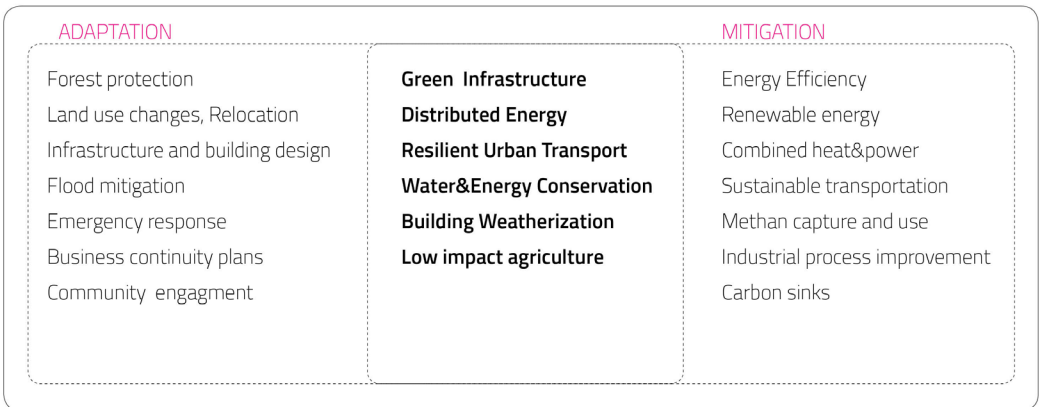


Fig1 / Green Resilience: Adaptation + Mitigation Synergies. Source / author

each a sizable stake in the discourse. The role of the landscape architect⁸ appears to be prominent in this emerging dialogue, for their competence to translate territorial and environmental parameters in design option that can be reflected on several project scale.

Methodology: Landscape ecology⁹ urbanism as an adaptive design

Landscape gives us an elaborated way of seeing, understanding and shaping environments, by adapting cultural and natural processes to create a new territory. The evolution of urban ecology and landscape urbanism create

⁸ / ASLA (American Society of Landscape Architects) Smart Policies for a Changing Climate <https://www.asla.org/climatepolicies.aspx>

⁹ / "Landscape ecology is the study of the pattern and interaction between ecosystems within a region of interest, and the way the interactions affect ecological processes, especially the unique effects of spatial heterogeneity on these interactions." Principles of Landscape Ecology by William R. Clark (Department of Ecology, Evolution and Organismal Biology, Iowa State University) in Clark, W., (2010) Principles of Landscape Ecology, Nature Education Knowledge 3(10):34 <https://www.nature.com/scitable/knowledge/library/principles-of-landscape-ecology-13260702>

new possibilities for restructuring ecosystem, understanding and designing city, able to generate a new image of urban settlement.

For thousands of years, shared and working landscapes were the base of human settlement; this would bring to the creation of a new economic, political and recreational relationship with their natural ecosystems, generating in many cases what we call today cultural landscapes entered in the collective imagination. But now, as we have seen through several of Corner's, Belager's, Sjimons' and many others' examples, landscape design is moving away from this ancient, controlled and arcadic image and it's embracing this new process-framework of design.

Corner says that in working landscapes (or, as he calls them, "Terra Fluxus") "operational logic is employed, over compositional design" (Corner 2005, 31). What he means is that the landscape is not a passive scene anymore, but is in fact an active working system connected to the human habitat, which it also supports. This interaction happens among many different fields and every project requires a lot of diversification because of their complexity.

Right now, what's most important to regenerate a city is the landscape. "As a process of discovery, design implies intentional shaping, manipulation and (re)creation. In the urban ecological context, it also means recovery of something that has been lost – if not

the precise forms of ecologies' past, then an attachment to landscape, to nature's rhythms, to place." (Lister 2007, 48).

The goal is to understand how architects, landscapers and urbanists can contribute to the emerging methodologies: they must, along with urbanists, learn to work in the new attachment to landscape and territory and their peculiarities, understanding the processes of nature and championing the ecology's role in making a place as the infrastructure for a reformulated landscape. This methodological approach can respond to global challenges in terms of the mitigation of anthropogenic factors and the adaptation of the city to risk factors.

Tab3. Landscape Urbanism Principles¹⁰
Fig2. Landscape Ecology principles example¹¹: Ecological networks, stepping stones¹² and wildlife corridors¹³

Tools: A systematic vision reframing spatial planning and territorial development through multiscalar approach

To make this approach effective, it is essential to have a systemic vision, made of visible and invisible connections.

It is necessary to overcome the geometrical funds and parcelizing urbanistic logic that characterized Europe in the last century, which allowed urban settlements to develop by interrupting the natural flow of some

¹⁰ / Source: elaborated by the author from <https://www.slideshare.net/chalisseryj/landscape-urbanism-52573976>

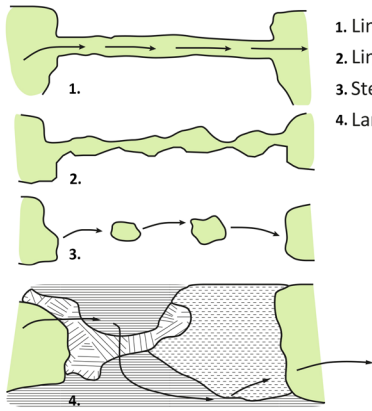
¹¹ / To be effective, in this process one must keep in mind elements of landscape ecology.

The changes in land use and climate are disintegrating habitats and rearranging the species' optimal areas, with wide impacts for biodiversity. Habitats that are small have limited resources for wildlife and support fewer species than larger patches. When a habitat is fragmented, the population in it may become isolated, and that can lead to inbreeding and declines in genetic diversity. We can reduce these negative impacts with appropriate conservation strategies: we can use, for example, stepping stones and 'wildlife corridors' (Foreman, 2008, 108- 109, 123) to help connect different habitat's areas, allowing species to move and so reducing the effects of fragmentation.

¹² / Saura, S., Bodin, Ö., & Fortin, M.J. (2014). Stepping stones are crucial for species' long-distance dispersal and range expansion through habitat networks. *Journal of Applied Ecology* 51: 171- 182. DOI:10.1111/1365- 2664.12179 see also: "Stepping stone patches of habitat help reduce effects of fragmentation" by EU Science for Environment Policy (3 April 2014) available from: http://ec.europa.eu/environment/integration/research/newsalert/pdf/368na5_en.pdf

¹³ / Source: elaborated by the author from <http://www.set-revue.fr/comparative-analysis-formulation-techniques-national-and-regional-ecological-networks> and <http://www.set-revue.fr/establishment-national-ecological-network-serve-biodiversity-pros-and-cons-ecological-corridors>

Typology of corridor



1. Line Corridor
2. Line Corridor with nodes
3. Stepping Stone Corridor
4. Landscape Corridor

It is a simple system consisting of:

- . core area
- . buffer zones
- . corridors
- . restoration areas

Elements of ecological networks

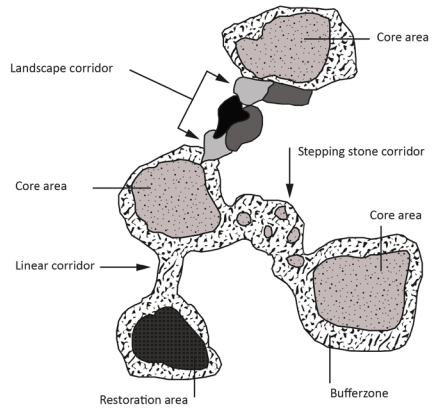


Fig2 / Landscape Ecology principles example: Ecological networks, stepping stones and wildlife corridors. Source / author

LANDSCAPE URBANISM		
PRODUCTIVE LANDSCAPE FOR HUMAN	ECOLOGY LINKAGE	
	WATER MANAGEMENT	BIODIVERSITY
<ul style="list-style-type: none"> . Transportation networks . Land Use Readjustment for Landscape Zone . Identity . Urban Agriculture . Public Space 	Water Sensitive Design	<ul style="list-style-type: none"> . Rain Garden . Detention Pond . Porous Pavements . Green Belt . Riparian Zone Filter . Bioswale
	Flood Water Management	<ul style="list-style-type: none"> . Dam . Polder . River Management . Deeping River . Dike . Straightening River

Tab.3 / Landscape Urbanism Principles

cycles that are an essential support of human and ecosystem habitats¹⁴, bringing to the fragmentation of many habitats with high ecological values.

For example, the natural water cycle in urban environments has a fundamental role. It's being acknowledged in many countries around the world. In Australia the practice is known as Water Sensitive Urban Design (WSUD) and Sustainable Drainage Systems (SuDS) in the UK, in Canada and USA Low Impact Development (LID)¹⁵.

Water management addresses the challenges of storm water through a network of decentralized BMPs

(Best Management Practices) and green infrastructures. The BMPs maintain the execution of natural hydrological processes (i.e. biological treatment) on undisturbed landscape, and reintroduce them in developed communities and sites.

In order to decentralize management at the site scale, the LID uses site areas that normally are not included in conventional stormwater management systems. For example, rooftops, paved areas, and linear landscape buffers distributed around in a site all have storm water management potential; a series of BMPs strategically selected, sequenced and located.

¹⁴ / Such as the water cycle, air quality and natural ventilation, etc.

¹⁵ / LID is a conventional US name. The Low Impact Development center is a no-profit water resources research organization, formed in 1998 to work with government agencies and institutions. <https://lowimpactdevelopment.org/>

It is a multiscalar approach able to give timely and detailed design answers, maintaining a systemic vision: it is inspired on nature-based solutions that have the objective of creating Green Blue infrastructures, which represent a possible solution to the mitigation of the negative effects of anthropic pressure linked to urban settlement (cleaning of air and soil) and can be a form of adaptation of the city to the problem of climate change.

To make this possible, this vision must be translated into a political will, both locally and on a global scale through international deal, which encourages a renovated image of the city, reconnected to the territory starting from the landscape fragmented elements and peculiarities, fitting them to territorial matrix, in order to define a systematic strategy.

World urban settlements are called to incorporate this vision in their policies as a systematic vision able to give answer to the global challenge we told about, in order to be part of international deal.

The matter is even more important for cities where there had been no vision of growth over time and who want to play a role in an international debate and aspire to be recognized as members of political and economic agreements. This is the case of Prishtina, which aspires to become a new European capital, through an image yet to be discovered. This approach can only represent an opportunity to be aligned with the contemporary debate,

incorporating in itself the uniqueness and peculiarity of its context.

Climate adaptation and green infrastructure¹⁶:

Nature-based solution in european guide lines and policies

The EU also promotes the use of nature-based green infrastructure¹⁷ solutions as effective strategies for Climate Adaptation^{18,19}. "Green Infrastructure "is 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. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings."²⁰

The report of EU Environmental Program²¹ "Green Infrastructure and Climate Adaption" says:

"Climate change adaptation actions are closely linked to Green Infrastructure as often Green Infrastructure can serve as an adaptation measure, e.g. floodplain restoration, urban Green Infrastructure to counter-act the urban heat island effect, etc.

The EU Strategy on Adaptation to Climate Change aims to strengthen Europe's resilience to the impacts of climate change by: Promoting action by Member States: the Commission encourages all Member States to adopt comprehensive adaptation strategies and will provide guidance and funding

¹⁶ / *Green Infrastructure in policy*, by EU Environment, available from: http://ec.europa.eu/environment/nature/ecosystems/policy/index_en.htm

¹⁷ / *The Natura 2000 network is the backbone of the EU green infrastructure and green infrastructures can provide environmental, economic and social benefits through natural solutions, helping to reduce the dependence on 'grey' infrastructure.*

¹⁸ / <http://ec.europa.eu/environment/integration/research/newsalert/archive/climate-change-energy.htm>

¹⁹ / "Green Infrastructure and Climate Adaptation" by EU Environment, available from: http://ec.europa.eu/environment/nature/ecosystems/pdf/Green%20Infrastructure/GI_climate_adaptation.pdf

²⁰ / EU Science for Environment Policy publications <http://ec.europa.eu/environment/integration/research/newsalert/archive/climate-change-energy.htm>

²¹ / *As Green Infrastructure can make a significant contribution to many sectors and EU policy objectives, it is being integrated into many funding streams including Structural Funds (the European Regional Development Fund (ERDF); European Social Fund (ESF)), the Cohesion Fund(CF), the European Maritime and Fisheries Fund(EMFF), the European Agricultural Fund for Rural Development (EAFRD), LIFE+ and Horizon 2020 project funds and the Natural Capital Financing Facility (NCFF) of the European Investment Bank (EIB).*



Fig3 / Planned Urban Green Corridors
Source / City of Barcelona.

to help them build up their adaptation capacities and take action²²” The main goal of this strategy is to ensure that protecting, restoring, creating and enhancing green infrastructures become a major part of spatial planning and territorial development when it offers a better alternative, or is complementary, to standard grey choices²³. Green infrastructure also includes built or restored landscapes²⁴: here, natural hydrologic processes are reintroduced into urbanized areas through the integration of tree canopy, pervious surfaces, and other landscape

features designed to absorb, infiltrate, retain, and treat storm water. Citizens, too, can benefit of this network of green (land) and blue (water) spaces, and it also supports a green economy, creating job opportunities and enhancing biodiversity.

Case study: Barcelona greenery and biodiversity plan for 2012-2020

A recent and concrete example of the application of European policies is the Barcelona Green Infrastructure and Biodiversity Plan is a strategic instrument that indicated the long-

²² / EU highlight three good practices on the topic:

- Agroforestry: agriculture of the future: the case of Montpellier (France, 2014)_ Climate resilient agroforestry; <http://www1.montpellier.inra.fr/safe/english/agroforestry.php>

- Rotterdam climate resilient city: flood protection (the Netherlands)_Rotterdam climate resilient city; <http://www.rotterdamclimateinitiative.nl/en>

- Lower Danube Green Corridor: floodplain restoration for flood protection (Bulgaria, Romania, Ukraine and Moldova, 2014)_ Lower Danube Green Corridor: floodplain restoration for flood protection <http://climate-adapt.eea.europa.eu/>

²³ / Conventional grey infrastructure —concrete channels, piped drainage systems, and treatment plants— tend to be single purpose, whereas green-blue infrastructure are multifunctional and offer a resilient, decentralized storm water network

²⁴ / Such as urban parks, cemeteries, and waterfronts, open space within master planned projects and infill development, greenway corridors, community gardens, and green schoolyards, plazas, and streetscapes.

term actions that are needed to have a green infrastructure that can serve a number of ecological, environmental and social functions. The goals are:

1. Bringing nature into the city with all the life forms it houses;
2. Achieving connectivity between the city and the broader territory and, lastly;
3. Making the city more fertile and resilient in order to face up to the very pressures and challenges it exerts.

For this purpose, the Green Infrastructures and Biodiversity Plan has been developed, defining the municipal administration's challenges, goals and commitments, in relation with the conservation of green and biological diversity in the city. To achieve this in a systematic manner, it has been composed setting out what the municipality aims to reach and various lines of action embark in with the mean to reach said goals²⁵. The greenery is conceived as green infrastructure forming part and parcel of the city, serving as an environmental and a social function. Green corridors connect far-away natural areas with urban ones and form a base for the city's ecological infrastructures to bloom by incorporating green spaces and cultivating biodiversity.

The network of urban green corridors in Barcelona's metropolitan area connects the green spaces within the city to the four major natural areas surrounding it: Collserola mountain range, the coastline, the river Besòs and the river Llobregat. What's essential is to realize that once we've enhanced urban green infrastructures, their bearing have been extended far beyond the city's

borders. The plan concords with the EU Biodiversity Strategy to 2020 and with the strategies that the EU has laid out along these lines by means of the Aichi targets for 2011-2020.

Fig3. Planned Urban Green Corridors²⁶
From fragment to framework: green infrastructure as integration of strategic planning in Prishtina
Cities lacking effective planning tools, as Prishtina, have grown over time and in space, often responding to some requests able to temporarily satisfy specific and circumscribed needs, but citing structural and permanent changes in an urban fabric that over time are configured as fragments of a mosaic. The result is the absence of organic and stable connections, reflecting the lack of a structural vision, which can be translated into weak hierarchies and poor urban quality.

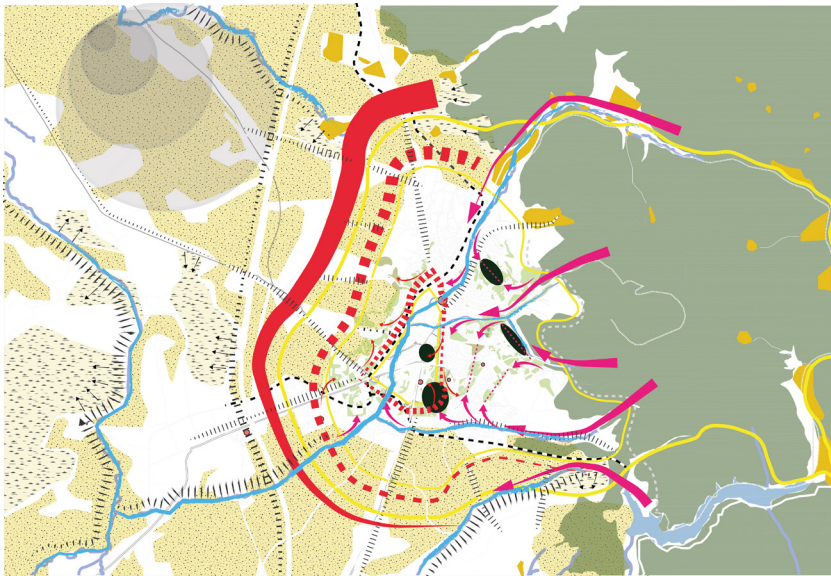
Today Prishtina gives us a chaotic and fragmented picture of itself. Its present, unresolved condition of chaos is creating considerations about the image of the city to be approved in the European confrontation. A study on the possibilities for Prishtina to delineate strategic actions to increase the urban resilience emerged, facing the high level of pollution²⁷ and congestion of a city that had an important urban growth without a planning. In the last decades the city acquired means of urban and land planning (Prishtina Strategic Plan 2004-2020; Spatial Plan of Kosova Spatial Development 2010-2020) that represent today efficient tools to structure the city and put it in relation with the territory. The guidelines underline the need to protect and preserve the environment (this would improve air and water's

²⁵ / In the document they state: "It is vital to strive towards a city where nature and urbanity converge and enhance one another, where green infrastructure attains connectivity and where green heritage achieves continuity with the natural area surrounding it. The aim is not for nature in the city to form a map of isolated spots; rather, seeking to forge a genuine network of green spaces."

²⁶ / Source: Barcelona green infrastructure and biodiversity plan 2020, Ajuntament de Barcelona <http://ajuntament.barcelona.cat/ecologiaurbana/en/what-we-do-and-why/green-city-and-biodiversity/green-and-biodiversity-plan>

²⁷ / REUTERS AGENCY: Bytyci, F. (2017) Reuters. Air quality in Prishtina unhealthy, cold winter bites Available from <https://www.reuters.com/article/us-balkans-pollution-Kosova/air-quality-in-Prishtina-unhealthy-cold-winter-bites-idUSKBN15S1MC> [accessed 01 May 2018].

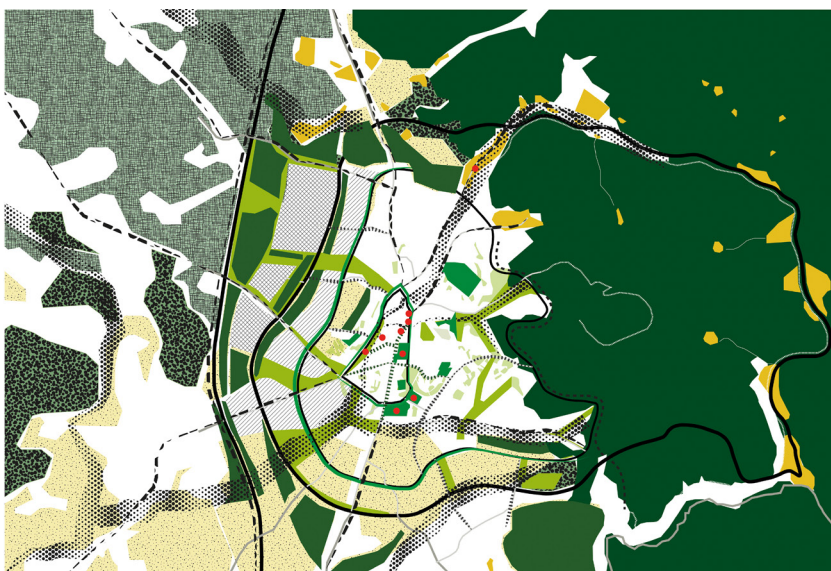
Bytyci, F. (2018) Reuters. Kosova 's pollution draws protesters as city bans cars from town center Available from <https://uk.reuters.com/article/us-Kosova-pollution-protests/Kosova-s-pollution-draws-protesters-as-city-bans-cars-from-town-center-idUKKBN1FK1ZW> [accessed 01 May 2018].



STRATEGIC GUIDELINES FOR GREEN INFRASTRUCTURE

- LEGEND**
- OPEN SPACES**
- AGRICULTURAL LAND
 - AGRICULTURAL ABANDONED LAND
 - RURAL ZONE
 - FOREST
 - GREEN CITY ZONE
 - CIMETERY
 - RIVER/LAKE
 - OBILIC COAL POWER PLANT
- ACCESS/TRAFFIC CONNECTIONS**
- EXISTING ROAD
 - PLANNED ROAD
 - PLANNED HIGHWAY
 - LIGHT RAIL/AIRPORT SHUTTLE
 - PEDESTRIAN
 - BORDER FOR BUILD UP AREA
- STRATEGY**
- ECOLOGICAL CONNECTIONS/RIVER MATRIX
 - ECOLOGICAL CONNECTION
 - BUFFER ZONE- EXTERNAL RING
 - BUFFER ZONE- RING
 - BUFFER ZONE- RING
 - BUFFER ZONE- INFRASTRUCTURE
 - BUFFER ZONE- RIVER
 - CITY REFORESTATION
 - TERRITORIAL REFORESTATION
 - GREEN ZONE TO BE IMPLEMENTED

Fig4 / Strategic Guidelines for Green Infrastructures in Prishtina
Source / author



STRATEGIC VISION FOR GREEN INFRASTRUCTURE

- LEGEND**
- OPEN SPACES**
- AGRICULTURAL LAND
 - AGRICULTURAL ABANDONED LAND
 - RECOVERED (REFORESTATION)
 - AGRICULTURAL LAND TO BE PURIFIED
 - RURAL ZONE
 - FOREST
 - GREEN CITY ZONE
 - CIMETERY
- ACCESS/TRAFFIC CONNECTIONS**
- EXISTING MAIN ROAD
 - PLANNED ROAD
 - PLANNED HIGHWAY
 - PEDESTRIAN
 - BORDER FOR BUILD UP AREA
- STRATEGY**
- ECOLOGICAL CONNECTIONS/RIVER MATRIX
 - INFRASTRUCTURE MAIN CONNECTION
 - BUFFER RING
 - BUFFER ZONE- RING
 - BUFFER ZONE- RING
 - BUFFER ZONE- INFRASTRUCTURE
 - CITY REFORESTATION (STRATEGIC PLAN)
 - OPEN SPACES (STRATEGIC PLAN)
 - GREEN ZONE TO BE IMPLEMENTED
 - PUBLIC SPACES TO BE IMPLEMENTED
 - INDUSTRIAL ZONE (STRATEGIC PLAN)
 - COMMERCIAL ZONE (STRATEGIC PLAN)

Fig5 / Strategic Vision for Green Infrastructures in Prishtina
Source / author

quality and avoid erosion and flood), to adopt new infrastructures and linking, to promote a sustainable use of the soil, to relaunch the agriculture as an economic engine, and also to imagine new, more sustainable ways to produce energy. The result of urban transformations should work as new relevant spatial and territorial configurations, in order to figure out a new image of a city understood as a system and not as the sum of fragments.

Because of this we find many considerations on why it is so important to integrate principles of landscape design ecology in Prishtina's urban planning, pursuing an integrated approach between territorial, urban

and architectonic scales, with specific interventions in the urban fabric that take account of the Spatial Plan of Kosova's guidelines and adhere to the spatial configuration of the Prishtina Strategic Plan. The goal is to connect all the fragments in a framework that is able to build step by step a picture of Prishtina as a new European capital city, with improved environmental welfare and life quality.

In such a complex and fragmented scenario, the first step consists in identifying the existing catalyst elements and understanding the energy that they are able to release in the urban system and defining its role in the urbanity. In the meantime,

we have to identify the territorial matrix to create the macrostructure of Green Infrastructures. Once these landing points have been defined, we proceed with understanding the level of hierarchies and connections that can be generated, starting from a critical analysis already addressed to a specific vision, which reflects the will to transform the city.

The specific actions concern:

- Integration of the territorial matrix in the spatial planning of the city: enhancing and redeveloping riverbeds that also act as an ecological corridor and strengthen the structure of Green Infrastructure; reshaping and reforesting the embankment, as a form of adaptation to flooding and erosion.
- Identification of public spaces within the city, which are catalyst elements and at the same time allow conversion into green areas of ecological value (stepping stones and storm water management). Specifically, reference is made to: Public Library, University of Prishtina, Youth and Sport Center.
- Creation of green diaphragms along the road infrastructures through the integration of trees, bioswales and lamination basins.
- Countering and rehabilitating the negative effects of coal-power plants in the north-west part of the city, through the strengthening of the green diaphragms in that direction; managing productive agricultural zone in non-edible agriculture (bioplastics, forest industry, textile industry, etc.) until the land has been purified from harmful substances; reforestation of non-productive agricultural land.
- Integration of agriculture in the peri-urban system and connection with the river and forest matrix, through the reintroduction of drains and water management (flooding and erosion prevention).

The fragments become elements of a matrix able to generate connections, constituting a framework, which strategically translates as level of

infrastructures necessary to create the presuppositions of an organic vision of the city that can continue to develop in time and space, defining a direction and a dimension of change.

In this way, Prishtina can unveil an image of itself that is a response to environmental and urban problems, and is aligned with the international trend of adapting the city to new global challenges, starting from its own peculiarities and environmental and urban features, which become matrixes and catalyst elements involved in the renewal and changing process.

Conclusions

Many cities are engaged in adaptation processes with the same purpose, but the results are always different. The factors that influence the results are certainly linked to the nature of the places, but above all to the ability to translate the will to change into a vision. In this case, politics and all stakeholders play a key role.

The tools and techniques for making up a change exist and have already been verified in several cities. The change must certainly be implemented step by step and with a multi-scale approach.

This means physically identifying the places in which to operate, deciding what kind of technologies to use and planning interventions and investments over time, bearing in mind that every intervention must be included in a programmatic and systemic vision, through the definition of hierarchies and priorities.

In this process the designers are called to advance proposals, solutions, to give answers to the problems that have emerged. But the choices are up to others.

The decision-making and management process entrusted to governance must be considered a very important part of the framework that composes the concept of sustainability and urban

resilience.

The city of Prishtina has the characteristics and the possibilities of how to design landscape and integrate landscape design in urban planning, reshaping urbanity and creating a new scenery. Those who govern must share this vision and translate it in reality.

Bibliography

ASLA American Society of Landscape Architects (2018), Washington D.C., Available from: <https://www.asla.org/climatepolicies.aspx> [accessed 03 September 2018]

Belanger, P., (2016) *Landscape as Infrastructure*. London: Routledge

Berkes, F., Colding, J., Folke, C., (2003) *Navigating social-ecological systems: Building resilience for complexity and change*. Cambridge: Cambridge University Press

Berkes, F., and C. Folke, (1998) *Linking social and ecological systems: management practices and social mechanism for building resilience*. Cambridge: Cambridge University Press

Burlij, L. (2012) *Infrastructure as Landscape: Imaging an Operative Ecology along the Cuyahoga River*. Master of Architecture. University of Cincinnati. Available from https://etd.ohiolink.edu/rws_etd/document/get/ucin1337101681/inline [accessed 29 April 2018].

Bytyci, F. (2017) Reuters. Air quality in Prishtina unhealthy, cold winter bites Available from <https://www.reuters.com/article/us-balkans-pollution-Kosova/air-quality-in-Prishtina-unhealthy-cold-winter-bites-idUSKBN15S1MC> [accessed 01 May 2018].

Bytyci, F. (2018) Reuters. Kosova 's pollution draws protesters as city bans

cars from town center Available from <https://uk.reuters.com/article/us-Kosova-pollution-protests/Kosova-pollution-draws-protesters-as-city-bans-cars-from-town-center-idUKKBN1FK1ZW> [accessed 01 May 2018].

CTCN Climate Technology Centre & Network (2016) *CTCN/CCAP Webinar: Green Resilience: Adaptation + Mitigation Synergies*. Copenhagen: CTCN Climate Technology Centre & Network. Available from <https://www.ctc-n.org/calendar/webinars/ctcnccap-webinar-green-resilience-adaptation-mitigation-synergies> [accessed 29 April 2018].

Clark, W., (2010) *Principles of Landscape Ecology*, *Nature Education Knowledge* 3(10):34

Corner, J., (2006) *Terra Fluxus*. In: C. Waldheim (ed.) *The Landscape Urbanism Reader*. New York, USA: Princeton Architectural Press, 21-33.

Forman, R. T T , (2008) *Ecology and Planning Beyond the City*. Cambridge: Cambridge University Press

Gunderson, L. H. and Holling, C. S. (2002). *Panarchy: Understanding Transformations in Systems of Humans and Nature*, Washington DC: Island Press.

Holling, C. S. (1973). Resilience and stability of ecological systems. *Annu Rev Ecol Syst* 4:1-23.

IPCC Intergovernmental Panel on Climate Change (2007) *Climate Change 2007: Synthesis Report-Adaptation and mitigation options*. Geneva: IPCC Intergovernmental Panel on Climate Change. Available from https://www.ipcc.ch/publications_and_data/ar4/syr/en/spms4.html [accessed 01 May 2018].

LID Low Impact Development

(2010) Beltsville: Available from: <https://lowimpactdevelopment.org/> [accessed 29 April 2018]

Lister, N. M., (2007) Sustainable Large Parks: Ecological Design or Designer Ecology? In: J. Czerniak, G. Hargreaves and J. Corner (eds.) Large Parks, New York, USA: Princeton Architectural Press, 35-57.

Mastrolonardo, L., Manigrasso, M., (2014) A.R.M.I. Adattamento Resilienza Metabolismo Intelligenza. Gorizia: EdicomEdizioni

Municipality of Barcelona (2012) Greenery and Biodiversity Plan for 2012-2020. Barcelona: Ecology, Urban Planning and Mobility. Available from: <http://ajuntament.barcelona.cat/ecologiaurbana/en/what-we-do-and-why/green-city-and-biodiversity/green-and-biodiversity-plan> [accessed 29 April 2018]

Resilience Alliance (2018) Resilience. Resilience Alliance. Available from <https://www.resalliance.org/resilience> [accessed 01 May 2018].

Saura, S., Bodin, Ö., & Fortin, M.J. (2014). Stepping stones are crucial for species' long-distance dispersal and range expansion through habitat networks. *Journal of Applied Ecology* 51: 171- 182. DOI:10.1111/1365-2664.12179

Sijmons, D., Hugtenburg, J., Feddes, F., Van Hoorn, A., (2014) Landscape and energy: Designing Transition. Rotterdam: NAI010 Publishers

Vöckler, K., Archis Intervention, (2008) Prishtina is Everywhere, Turbo Urbanism: the Aftermath of a Crisis, Amsterdam: Architecture & Natura

Walker, B., C. S. Holling, S. R. Carpenter, and A. Kinzig, (2004), Adaptability and Transformability in Social-Ecological Systems. *Ecology and Society* 9:5.