WHEN A RIVER FLOWS

Observatory of the Mediterranean Basin

When a river flows

Strategies for environmental, touristic and infrastructural development of Albanian rivers

A Project of the Joint International PhD Program

POLIS University Albania / Ferrara University Italy

Tirana
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Besnik Aliaj and Loris Rossi are the scientific responsible for this publication, developed as result of the international PhD workshop organized in the frame of the IDAUP - International Doctorate in Architecture and Urban Planning programme between POLIS University of Tirana and the Department of Architecture of Ferrara University, Italy. The publication collects practical and theoretical experiences elaborated within the context of the Applied Research Department, the research unit Observatory of the Mediterranean Basin (OMB) and MetroPOLIS l.t.d. In this publication Besnik Aliaj and Loris Rossi have also contributed in terms of contents in the introduction, interventions in some chapters, conclusions and in the elaboration of the index structure.

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** All the contributions of this book have adopted the Harvard Quote System.*

fig / workshop sketch done by PhD students

The book contributes to improve the state of art on water-related design approach for landscapes, cities and territories in Albania. The collection of positions and experiences represents a relevant contribution to the field by crossing a wide range of scales and contributions: theoretical essays, doctoral investigations, research by design projects. The book outlines a dynamic scenario of ongoing process in Albania relevant not only at the local scale but also at the European level. By focusing on waterscapes, the book represents significantly contributes to the international debates of planning and design for future cities and large territories.

Ass Prof Sara Favargiotti, PhD
University of Trento, Italy

"When a River Flows" is a product of a long-lasting theoretical and practical engagement of Co-Plan and Polis in planning, that has embedded a history of fruitful cooperation with a number of international institutions, most recently with the Ferrara University. The book is very precious in that it clearly shows, taking as examples real cases (Osumi River/Semani Basin) and being based on a workshop, the value of interdisciplinarity in spatial subjects and planning. Competently presenting papers with different approaches, ranging from research by design to socio-political ones, the book reveals all the complexity of watershed areas' governance and offers to all planners a valuable tool.

Prof Pantelis Skayannis, PhD
University of Thessaly, Greece

Preface

As it was stated from the beginning, this is a publication materializing the work of a one-year project, and it is part of a series of scientific publications prepared by, OMB Observatory of the Mediterranean Basin, a unit of RDI Research and Development Institute at Polis University, Tirana Albania. It summarizes the project undertaken by PhD students and the respective staff of the joint international PhD program organized successfully since several years, in cooperation with Ferrara University Italy. More specifically the publication contains work done during the academic year 2015-2016.

As a methodology, Polis University initially developed a first research publication, namely: Albania 2030 Manifesto. A national spatial development vision – which could develop a starting methodology and technique on how to address and draft national scale policy documents and plans. The objective has been to link research with local needs and to promote positive and sustainable developments in emerging economies such as Albania. In the later years, the research units of both schools, respectively OMB (Observatory of the Mediterranean Basin) at Polis and SEALINE at Unife, together with the joint team of PhD Program, tried to detail each year focused geographic regions, by concrete thematic projects that address practically different regions of Albania. In this way the research work becomes useful, practical and tangible to the local development needs.

After visioning of 'Durana' Metropolitan area (2015); and Southern 'Albanian Riviera' region (2016); we presented in this publication the outcomes of visioning for the third region of Albania. This time the research and visioning are based on "watershed" planning principles of Semani River, at central Albania. As one can see, 'water' has been over years the main theme of our research interest, aiming to develop and consolidate the methodology and framework of planning and design for future cities and large territories.

Therefore, working in teams and in the field, has been always combined creatively with pure research work of desk and academic nature. The exchange of staff and researchers between Albania and Italy, working online, or confrontation face to face with best practices as well as failures, makes the work unique, both in terms of approach and methodology. We strongly believe that it might give useful hints Albanian authorities, and serves in the same time as an international scientific and professional reference for replicability in other situations and countries.

Prof PhD Besnik Aliaj
Rector of POLIS University, Tirana

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introduction

Islands and Fragile edges / Reclaiming the river landscape in Berat's Historical center

PhD Loris Rossi
Head of the Applied Research department and OMB research unit / POLIS University

Introduction

This new publication of the Observatory of the Mediterranean Basin (OMB) tries to build on the previous investigations related to water issues, but shifting the focus from the Albanian Riviera to the river basin. The choice of title for this volume intends to convey importance to the idea of the river as a connection between land and sea. "When the river flows into the sea" offers a twofold reading: on one hand it confers relevance to a condition present in the Albanian territory which is still waiting for an intervention; on the other, it proposes a project for the future in terms of resource investment prevision, contributing to the preservation of the river. Continuing the tradition started three years ago, and thanks to the national and international contributions to each volume, our PhD publications have become a reference point for the research community, whereby the meaning of the project can be tested trough theory and practice.

As it often happens in the architectural research disciplines, we have very limited opportunities to understand the potential of a certain topic, unless we try to transfer and validate theoretical approaches through practical and research activities. Therefore one of the main objectives of the Polis/Ferrara International PhD workshops is to train PhD students on the idea of 'research by design', producing, in a relatively short time, operative tools and defining methodologies that are replicable in similar contexts. Today's Albanian context appears as a field of great relevance, our role as practitioners and academic researchers is to observe and select specific topics which will open international debates. The topics selected for the PhD Workshops that take place every year, relate to the issues that Albania is facing in this precise historical moment.
The structure of the book reflects one of the peculiarities of the Polis/Ferrara International PhD: the multidisciplinary approach to research in architecture and planning. The topics that evolve around the Albanian Rivers, can be found between nature and artifice and they include deliverables ranging from the formulation of new sustainable tourism strategies, to infrastructural development proposals.
The book is divided into four main sections. The first section includes the introductory chapter and the presentation of the Workshop, emphasizing the impact that such publication could have on the local authority and in the field of professional activities.

The second section is entitled "Interdisciplinary exchange" and it explores architecture's ability to absorb information from other fields of knowledge. Architects, Planners and international expertise coming from a broad range of research fields, are normally involved in the workshops and often team up with POLIS and Ferrara University when taking part to architecture and urban design competitions. In this section three main aspects concerning rivers are explored: watershed management, restoration of biodiversity and industrial pollution. Such aspects were a matter of discussion since

Fig1 / Surrounded Islands, Christo and Jeanne-Claude Biscayne Bay, Greater Miami, Florida, 1980-83
source / arqparaelarte.wixsite.com/arquitecturaarte/1965---1970

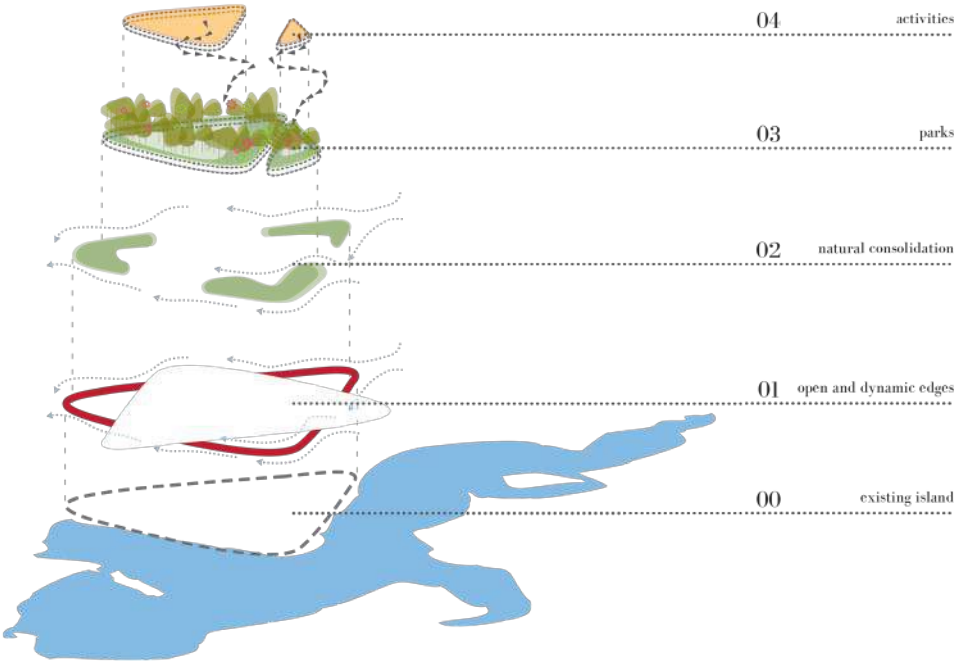

Fig2 / An image of the possible preservation of Berat Island source / Metropolis, 3ti lab and dsb landscape office report.

the very first stages of the workshop, and they generated several debates, which ultimately led to the decision to adopt strategies that would emphasize the capacity of the river landscape to activate remediation processes.

The third section of the book presents the Workshop results. First the design experience is described through project presentations; while, in the second part of the section, the publication leaves room for the scientific contributes of PhD students, who address the topic of the river and offer their personal reflection though a scientific paper.

The fourth and last section deals with design practice and academic experience. Architecture and Urban projects are used as references to generate ideas and practical solutions applicable to the Albanian context. One of the main projects, which became a focal point for this PhD workshop, was the International Design competition promoted by Atelier Albania in cooperation with the Municipality of Berat and the office of the Prime Minister: Osumi Island in Berat, Albania (Agency 2013). The Observatory of the Mediterranean Basin, together with Metropolis architecture office, 3ti-lab (Rome) and dsb office of landscape in Milan, were one of the shortlisted groups selected to present their design proposal. Also POLIS University, in cooperation with Felixx, a landscape architecture office based in Rotterdam, was selected and participated as a separate group to the same competition.

Evocative morphologies

For several reasons the Berat Island Design Competition was a source of inspiration to identify design tools as well as theoretical references applicable to similar contexts. In particular, the idea to intervene on the Berat Island in the Osumi River (which was a brief competition request), opened up interesting debates about the potential of a natural morphology, such as Islands, in establishing new ways in which human activities can interact with natural elements that belong to the river. Working with issues related to the preservation of the Osumi Island[1], and given its proximity to the historical center of Berat, calls for reflections on the strong contrast between two elements which have been matter of discussion for centuries: the natural environment characterized, in our case, by the strength of the River, and the artificial built environment generated by man (fig.1-2).

This apparently simple dichotomy gave way to a stimulating design opportunity. If, for a moment, we concentrate our attention on the concept of natural versus artificial, we can argue the importance of certain existing morphologies of the surrounding environment. The interaction nature - artifice, and vice versa, is regulated by repeated transformations operated by human activities, always trying to improve the coexistence of human and natural environment. Architecture has the capacity to exchange with the natural context operative structures defined by specific morphology and clear characteristics. Because of this, the word

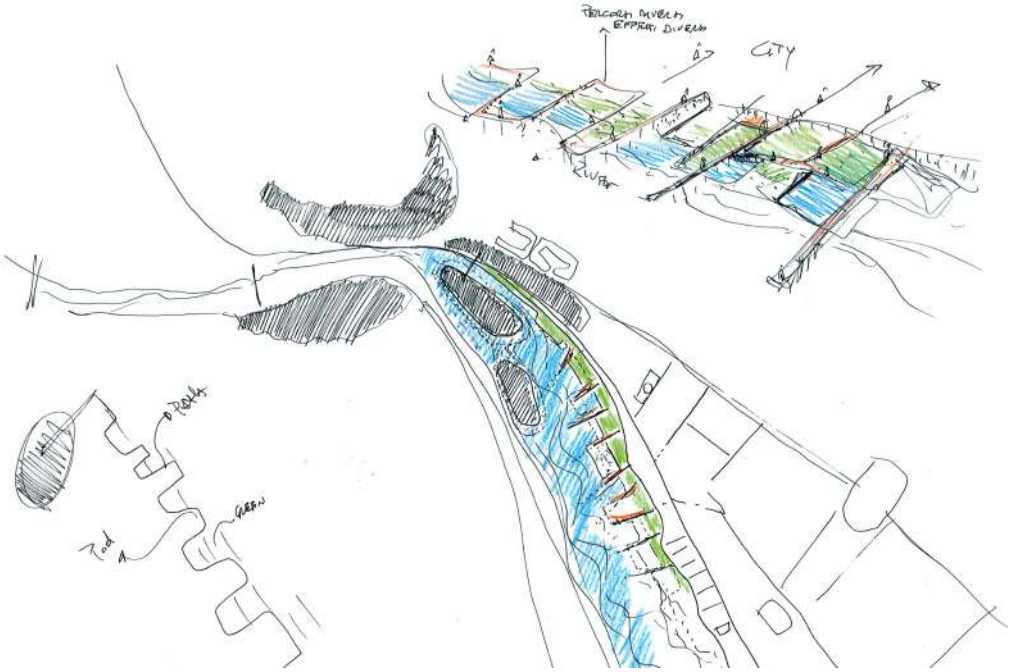

Fig3 / Sketch on the idea of fragile edges
source / the author

'island' can be considered as an analytical tool as well as an operative one due to its capacity to absorb information coming from the artificial environment as well as from the natural one. For this purpose, it is rather interesting how in 1971 Italo Insolera (Italian Architect and Urban Planner) argued how, in the eternal fight of men to control nature, there was always an attempt to build an environment dominated by an established social class and constituted by consolidated typologies: "Precise, defined, concluded and conclusive environments are created: place that reflect the perfection of a world, the rationalization of a world, its codification and transmission"[2]. Later on, in his text, he makes a list of consolidated architecture examples, choosing between building and city structures, but as common element he always underlines the relationship between Nature and the built environment.

In Italo Insolera's reflection we can find a prolific field of ideas. His words remind us of the main characteristic of an architecture, its precise edges, clear autonomy and function; a kind of artificial island submerged in a sea of connections[3]. The issues put forward by Insolera about consolidated typologies, belong to a well known historical process, whereby between the conflict nature-building construction, the strength of the natural ecosystem is always dominated by specific technologies and consolidated morphologies elaborated by men. The impetus of nature has been controlled and adapted to human needs for centuries thanks to technological innovations that belong to the artificial environment.

What has been discussed so far brings us to reconsider the totality of Berat's shape, composed by a compact mass of buildings sharing similar architectural characteristics and expressing the ability to be in harmony with the surrounding topography. A first attempt to define design tools aimed at reclaiming the river landscape, resulted in the identification of three fundamental operations: identification, selection and regeneration of natural as well as artificial urban islands. Such operations are aimed at intervening in a consolidated urban context, improving the connection between the Osumi River and Berat's city center.

1 / One of the main objectives defined by the tender, was to explore the capacity of the Osumi island to be resilient to the Osumi river's constant change in water level and the high risk of overflow. For more information see: http://competitions.planifikimi.gov.al/beratisland/

2 / Translated from the Italian text "Vengono proposti ambienti precisi, definiti, conclusi e conclusive: ambienti che riflettono il perfezionamento di un mondo, la razionalizzazione di un mondo, la sua codificazione e trasmissione" (ITALO, 2010, p. 7)

3 / It is important to underline the importance of this issue treated by Insolera especially considering that, years later, in the 1977 Oswald Mathias Ungers and Rem Koolhaas wrote the famous manifesto for the city of Berlin: "The City in the City" (UNGERS, KOOLHAAS, REIMANN, KOLLHOFF, & OVASKA, 2013). Certainly the two cases are different in terms of content, but it fits almost perfectly with the Berat Island case in reference to the idea of using operative morphologies, selected in the natural environment, to deal with the fragility of cities. It must be added that Insolera didn't explicitly mention the idea of 'Island' in terms of pure operative morphology but, as it frequently happens in architecture, specific words can activate principles and define clear pictures that can be applied to a different contexts.

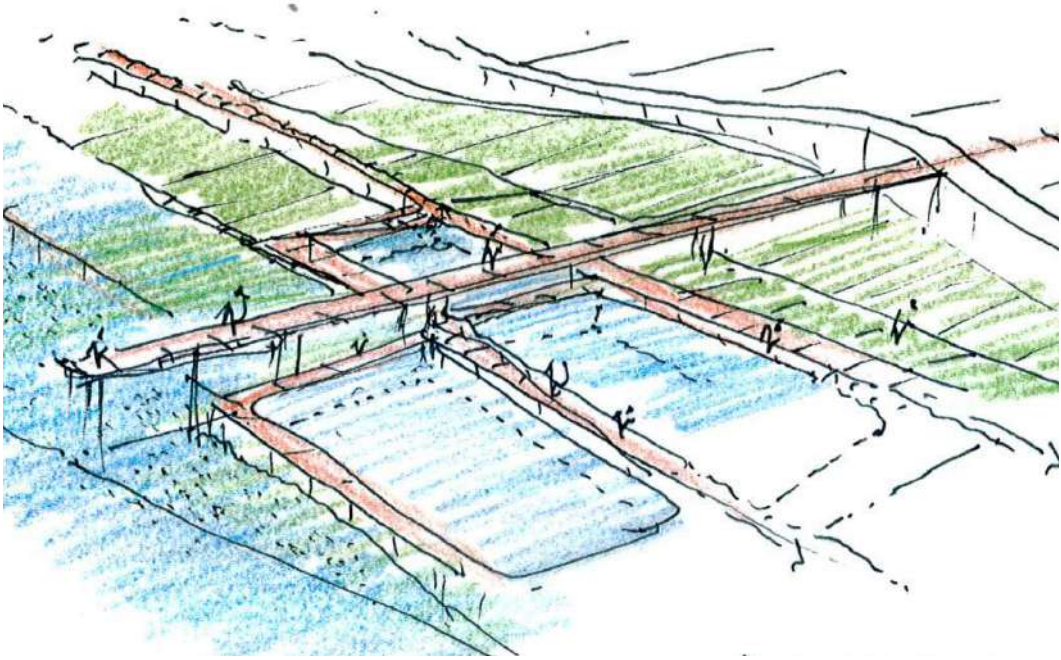

Fig4 / Sketch on the riparian river bank with natural pools and transversal city connections source / the author

Observing the city of Berat from above, it looks as if the river excavates and wraps the constructive mass, separating parts of it and revealing its fragility on the river's edges, as well as in the urban and natural islands. All the above mentioned conditions perfectly describe the main characteristic of Berat's historical center, composed by a fragile edge and a more compact island. These are essential conditions to determine a new relationship between the intemperance of the Osumi river and the city it interacts with.

The Berat competition became emblematic, especially considering the objectives defined by the tender[4]: to connect Osumi Island to Berat's city Network, addressing also the delicate issue of the Osumi river flooding risk. Within the contact of this essay, I will not expand upon aspects concerning the issue of Osumi river resilience, because in order for it to be an exhaustive account, it would require taking into consideration multiple complex factors - we would have to analyze the river's geographical origins, something which requires specific expertise. Based on the previous considerations, the essay will concentrate on small scale interventions and design approaches that allow for the river edge to be reinforced while the city is extended. I
In my opinion what is more relevant for our investigation, is to underline the possibility of the river to become an organic part of the city. In order to understand the importance of the river as part of the city we need to focalize our attention exactly on the moment when the river transfers its natural strength to the city and vice versa. The edge crated by the river is an unpredictable sign, which changes its appearance every time the water level of the river shifts. This sign, on both river banks, expands or contacts following the constant changes in the river energy. Based on the above observations, the river edges - especially the ones closer to the urban settlements - became the object of design actions: Architecture between the consolidate city and the fragile river edges. In this framework, and while searching for the relationship between city and river, the conceptual limits crated by Osumi river suggest a double approach: from one side the fragile edges seen as components for the elaboration of design tools; form the other, the idea of a totally new concept of 'river edge' within the water landscape of Berat. Both interpretations become active design exercises which attempt to operate in a new space, a blurred spatial interval, between Berat and its river.

To intervene in a such delicate field, requires the acknowledgement of the river's weaknesses, and the conversion of the latter into focal points of the design investigation. In other words, the goal launched by the design competition tender - to promote a new accessibility to the river and the Osumi island - needs to be linked to the un conventional activities of the river also in terms of nature and energy.

Therefore the new river edge must be transformed into a dynamic system which respects the connectivity with

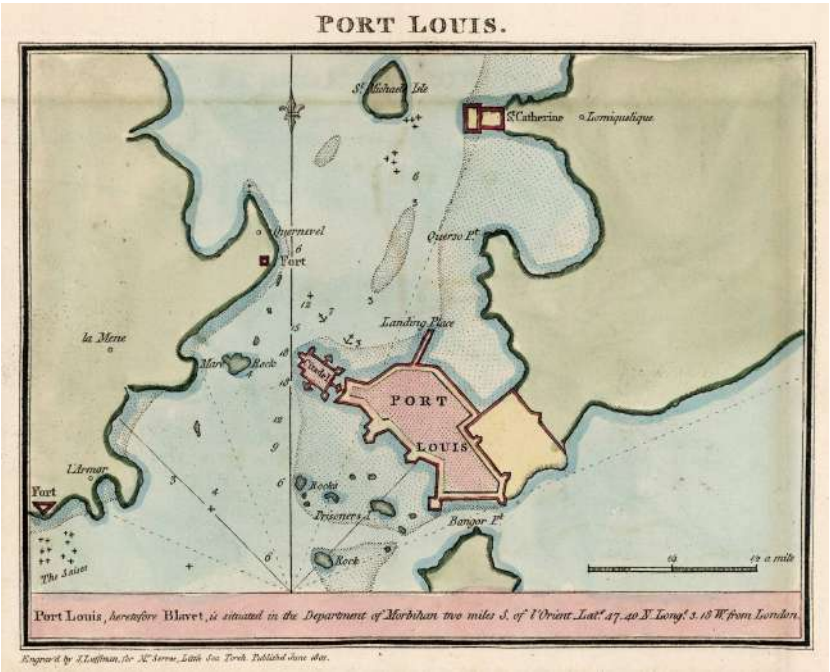

Fig5 / An Image from the book "Little Sea Torch", by Serres John Thomas source / davidrumsey.com/luna/servlet

the city, while guaranteeing flexibility and responding to the different water levels. Such kind of flexibility needs to be aligned also with the objective of preserving the River's biodiversity and its structural soundness. In order to give a possible suggestion on how to operate in such a relevant site, the idea is to try to emphasize, once again, the connectivity between the 'natural' and the 'artificial'. The line formed by the river – seen as a separation element from the consolidated urban area of Berat - is considered as an edge which holds the potential to mediate and compensate mutations, given that we introduce enough flexibility to dampen its variations. In practical terms, the suggestion is to devise an artificial edge able to change and adapt to the different states of the river (fig.3-4).

The topic of the fragile edge became an opportunity to add to the existing river edge a new pedestrian infrastructure. The new infrastructure responds to access and connectivity needs of the city and links the artificial island with the existing natural one, while preserving and regenerating the existing riparian vegetation. This new path is characterized by a combination of factors that underline, without restraining, the real nature of the Osumi river. The beauty of the artificial line suggests new ways to use the fragile river edge. In most of the cases such operation is merged so harmoniously with the concept of river landscape, that even when the river water level rises, the proposed path can be temporarily erased by the river without losing its original purpose: to guarantee mobility along the river during the other seasons. This infrastructure is meant to absorb the natural character of the river, to live in harmony with the existing historical city and, at the same time, to be welcomed and absorbed by the surrounding landscape, without compromising the image of the traditional city.

Another characterizing aspect of the above mentioned investigation consists in the importance of 'drawings' as tools to generate ideas in landscape architecture. The identification of new morphologies in the natural landscape becomes a fundamental operation to guarantee an organic coexistence between nature and artifice. In this case the importance of drawings, seen as an act of mediation between the realm of the natural and artificial, was most evident when it helped to identify and underline new landscape characteristics. Before being materialized in an artificial intervention, the concept of water landscape in the Berat Island proposal, must be understood as fragile edges and islands shaped by a natural energy. Following this principle and searching for new operative morphologies, the attention falls on some old maps, drawn with the scope of guiding sailors. It's interesting to notice how shifting the observer's point of view and thanks to the

4 / From the official tender: "The competition area is both a target and a test site at the same time. It is a small island in a relatively small historic city in Albania, the city center of which is part of the UNESCO World Heritage Sites". (http://competitions.planifikimi.gov.al/beratisland/).

peculiar characteristic of mute drawings, the land domain and the water domain acquire interchangeable meanings. The drawings by Serres John Thomas in his book "Little Sea Torch" (SERRES 1801) are an extraordinary schematization of the coastal landscape: a continuous line separating land and sea and surrounding the main harbors. It is an edge that borders a mute scenario which belongs to the land, but has the capacity to orient sailors during their trips on the open sea (fig.5).
'Islands' and 'fragile edges' become architectural objects when drawings are able to become operative shapes in the landscape. The dynamic edges of the Osumi river suggest multiple ways to reconnect the city with its natural surroundings. The artificial signs proposed by the competition entry projects reverse the role of the river in the city: people can finally rediscover the missing links between Berat's permanent architecture and the continuous mutations of the Osumi river.

In conclusion, this publication wishes to emphasize the importance of the water related topics in Albania, suggesting useful tools to operate on its waterscapes. But, most importantly, the following pages wish to open new debates on the concept of harmonious coexistence between architecture and natural environment (fig.6).

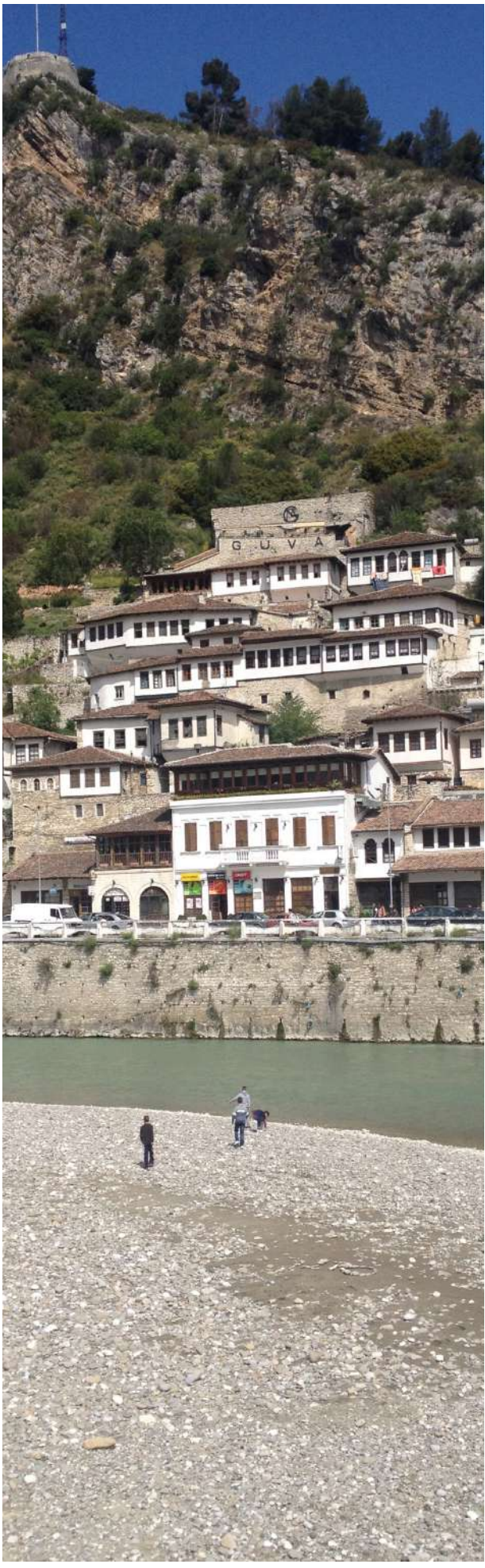

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Fig6 / View from the Osumi river vs a view from Berat Historical center source / Metropolis, 3ti lab and dsb landscape office report.

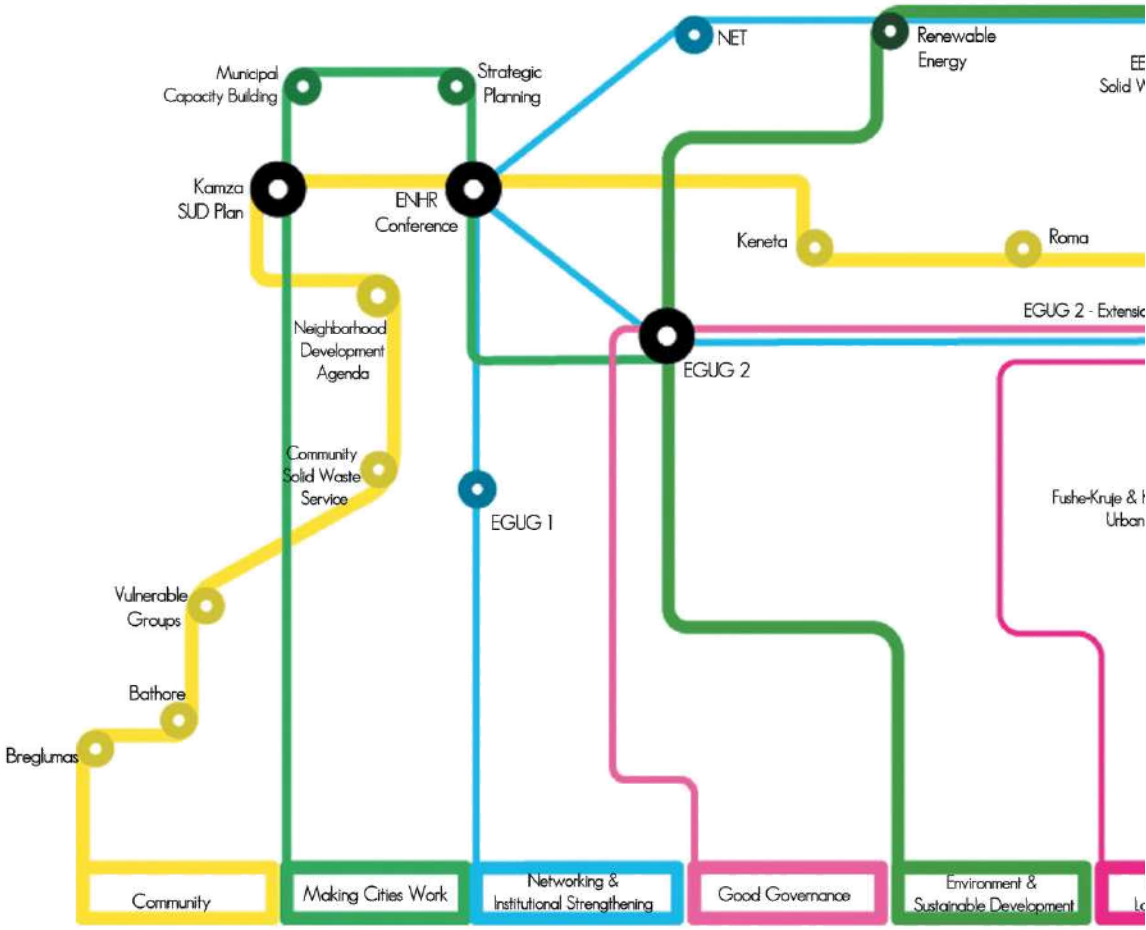
Co-PLAN / An Urban Chronicle

Co-PLAN / Institute for Habitat Development
Tirana, Albania

The journey of Albania's modern urban transformation (and not only) is closely related to 1992, like much of its most late 20th century contemporary history. The end of a centralized system marked the beginning of an all-encompassing reform sweeping across all sectors simultaneously, catalyzing fast physical changes on the ground. The pace of such physically impactful changes was hard to match on a mindset and policy level. The enthusiasm and energy feeding the urban growth in Albania was hard to contain, and it started manifesting features of cemented chaos, particularly in the urban areas. Both central and local governmental institutions failed to comprehend and keep apace with the socio-economic and political changes at the time. They remained confined to the inherited traditional modus operandi, which was not designed to anticipate, or regulate any of the transformations. Whilst a good part of the majority viewed and used this institutional and legislative gap to adopt a ' laissez faire' attitude by exploiting and making questionable use of resources and land alike, not all news was bad news.

Amidst these transformations, in the early 1990s, as one in four Albanians left the country forever via emigration, a few young Albanian professionals, supported by a Dutch Development Organisation (Cordaid), saw suitable ground, and seized the momentum to introduce experimental urban planning practices in Albania. This pioneering incentive was initially met with skepticism from officials and local professionals, who for various reasons represented what was to develop into a sequence of challenges. The young professionals, who grew to form one of Albania's forerunning institutes (organisations) in urban development, Co-PLAN, Institute for Habitat Development, started developing and experimenting their methodology with informal settlements/neighbourhoods. The first such neighbourhood to develop informally was Bathore - growing out of Tirana's northern part, serving as a showcase of two crucial drivers in the Albanian urban transformations of the early '90s:
(1) With the change of the political system, people were reinstated their right to freedom of movement, leading to large-scale, unmonitored internal migration, mainly from rural to urban areas;
(2) Great demand for housing stock and improved living conditions lead to the construction industry skyrocketing in an almost complete legislative vacuum. Consequently Bathore was only but the start of a long journey of good urban governance interventions on a neighbourhood and later city and national level which looked at planning not merely as simple planning, but as concerted effort to achieve concrete, tangible, results. Through a philosophy of performance-oriented plans, strengthening of local government finances, connecting individuals' interests to government priorities and introducing public-private-partnerships, became an inseparable part of the Co-PLAN's good urban governance agenda.
Over the past 20 years, several local government units in Albania were

Fig1 / Historical pictures of the Co-PLAN team during the first field works source / Co-PLAN archive.



assisted in with various aspects of participatory processes, particularly in key reform moments (such as the Territorial Administrative Reform); such as designing Capital Investment Plans to facilitate an active role of the municipalities in guiding transformation processes; as well as Medium Term Budget preparation and implementation. And since sustainable development cannot be understood or achieved without environmental management, the latter became a core pillar in Co-PLAN's activity.

The projects that were to follow, supported by a number of international donor organisations, further highlighted the need for knowledge making as an important instrument to influence and stimulate good governance and good policy-making in Albania. Ever since, Co-PLAN has developed an extensive applied research portfolio bringing together bottom-up challenges with good policy-making, by involving different local and international stakeholders, beneficiaries students and communities at large into the process.
In 2005, Co-PLAN proposed to the parliamentary political parties of Albania a Platform for planning and administration of the national territory, inviting the political actors to discuss what has previously viewed as 'taboo'. Some suggestions have already been materialized in a series of legislative initiatives, others were met with resistance or misused politically, adding to the continuous battles waged between the formal, sustainable good and the informal, temporary fix.
Understanding the importance of establishing a new cadre of professionals 2006 saw Co-PLAN furthering its commitment to knowledge-making, qualitative research, and the ongoing capacity building through increasing qualified human resources in urban and environmental planning and architecture and design, as well as the need to impact at policy-making level, with the spin-off of POLIS University – The International School of Architecture and Urban Development Policies.

Today, Co-PLAN, Institute for Habitat Development constitutes a pioneering and leading know-how non-profit organisation in the field of sustainable development, city-making and good governance, with its core activities building upon four expertise

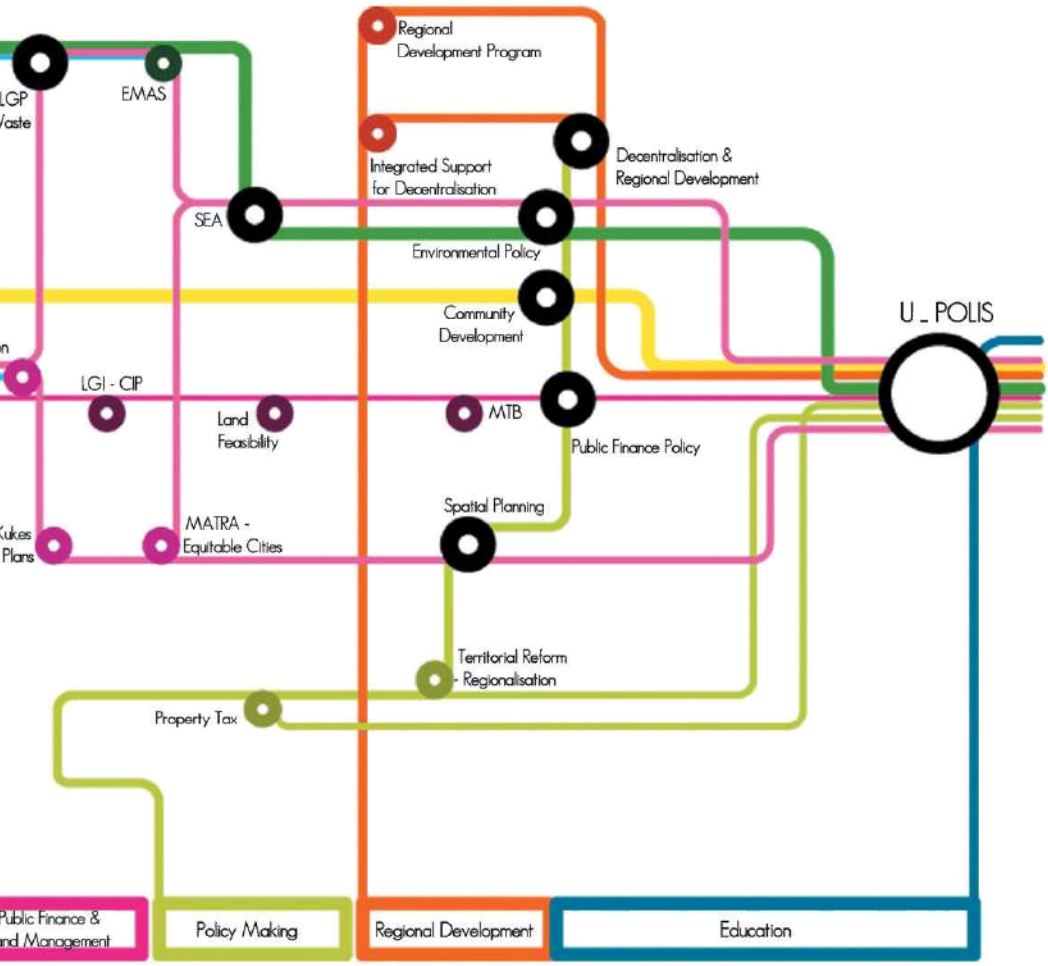


Fig2 / Part of Co-PLAN's project portfolio
source / Co-PLAN

areas, namely:
(1) Spatial Planning and Land Development;
(2) Urban and Regional Governance;
(3) Urban Environmental Management;
(4) Public Policy, Research and Advocacy.

At the core of Co-PLAN's activity is the work with people and institutions, to foster tangible social transformation and positive change on the ground by inducing change-driving knowledge in our society for smart management of our habitat. Co-PLAN fulfils this mission through means of pilot activities and advisory services financed by national and international institutions and direct involvement with communities, local government units and other non-governmental organizations in the field of urban and regional management, environmental management, and municipal finance. Over the years Co-PLAN has implemented projects ranging from 10,000 - 4,000,000 Euro all implemented with the same dedication and accountability.
In more specific terms, the activities under each field can be summarised as follows:

(1) Spatial Planning and Land Development – This field constitutes the core of Co-PLAN's technical expertise, and a pioneering field for the Albanian context when first introduced back in 1995 through grassroots participatory neighbourhood upgrading programs, mainly focused on informally developed settlements. Through applied and research projects, Co-PLAN has supported communities, local governments, NGOs, and business communities in addressing sustainable urban development through the preparation of city development strategies, urban regulatory plans, neighbourhood development plans, and other guiding documents, yet at the same time building capacities. Through its participatory planning approach, in the process it has engaged key actors and interest groups, such as local communities, authorities, private sector, and other key stakeholders in planning processes. Today, Co-PLAN plays an important role on a policy-influencing level, proactively engaged in the discussion on regionalisation of Albania, more specifically in the "Regional Development Management Reform"; further, pro-actively engaged since 2010 in the reviewing of the law and bylaws on territorial planning, related capacity building for a correct implementation,

Fig3 / Co-PLAN Director Dritan Shutina during projects activities
source / Co-PLAN

coaching and assistance to the LGUs for the preparation of their Territorial Comprehensive Plans, etc., building on one of its core strengths, which is excellent knowledge of the legislative framework applying on both local and central government level.
Co-PLAN's ambitions, involvement and commitment to this field have matured over the years, clearly reflected in the multiple scale activities (i.e. the neighbourhood, city, regional, inter-regional, and national levels), and the multitude of actors it engages with, such as communities, local and central government, businesses, donors, and civil society organizations.
For over 10 years, Co-PLAN has closely worked with municipalities to provide policy advice on subjects pertinent to sustainable development, introducing subjects such as sustainability, green cities and aspects of city resilience.

(2) Urban and Regional Governance - Finances constitute an inseparable element of any development, and as such since many years Co-PLAN has seized the importance of municipal finance management to the current urban developments in Albania. To this end, Co-PLAN works with local governments to improve municipal finance management practices through the preparation of the capital investment programs, annual and mid-term budgets generated through participatory practices, cost analyses of public-private-partnerships, and the improved levying of taxes. Social accountability, and transparency matters make for an important part of the Co-PLAN project portfolio, focusing on the importance of open data for improved local government performance in terms of accountability and transparency in quantifiable terms.

(3) Urban Environmental Management - Sustainable environmental management makes for an essential part of Co-PLAN's core expertise and project portfolio. Territorial development, particularly when rapid and informal, can have vast and irreversible consequences on the environment.
As such, the focus on this particular field has been on the improvement of environmental management (practices) from an integral perspective, including territorial, research, policy, and capacity development. Although the environment constitutes a separate, dedicated unit, we treat environment as a cross-cutting theme, for it is not possible to separate it from other developments and institutional and financial implications. For instance, the territorial plans – the Strategic Environmental Assessment as a key component, comprise numerous analyses of environmental mediums, the impact of development, including environmentally protected areas, forests, biodiversity, water and aquifers, etc. The integral approach, allows also to look at protected areas and ecosystem protection, not merely as conservation, but how to make them useable in a sustainable and resilient manner, contributing positively to economic development, especially in circumstances where access cannot be restricted.

Fig4 / The program manager Zenel Bajrami during Elbasan Strategic Plan presentation source / Co-PLAN

From an urban environmental management perspective, we work also on environmental public services standards and efficiency (particularly in solid waste management, energy, etc.), upgrading capacities, strengthening institutions through the provision of guidelines and on-the-job assistance, connecting environmental management projects to the concept of public private partnerships, etc.

Being embedded in POLIS University and having the possibility to tap into the infrastructure (laboratories) and human resources available at the university, Co-PLAN can undertake specialised research work, and collaborate with the academic staff from the Environmental Management discipline taught at the university. This research work, goes beyond the urban dimension of environmental management, and focuses on topics such as ecosystem services (valuation) and common pool resources focusing on forests, integrated watershed management etc. These topics constitute also Phd researches that Co-PLAN fellows are currently carrying out.

(4) Public Policy, Research and Advocacy - Public Policy, Research and Advocacy- Research forms an integral and extensive part of Co- PLAN's working methodology and project portfolio. Starting from the early days of informal developments and the discussion on their legalisation and integration, Co-PLAN extensively analysed the phenomenon from a socio-economic perspective (resulting in a number of publications and policy platforms), such as: The foundations of policy reform for legalization and integration of informal settlement (1995-2005); Poverty Social Impact Assessment for the water sector (2004), the Damage and Need Assessment in Agriculture in Kosovo (1999), the Regionalization Policy in 2014, etc. In addition, Co-PLAN has engaged during 2007-2012 in a broad program financed by Open Society Institute for strengthening internal capacities in policy influencing, policy research and writing, lobbying and advocacy. To date, Co-PLAN is implementing in partnership with Partners Albania and Open Society Foundation Albania LëvizAlbania – Local Democracy Promotion Project, which aims at supporting (both capacity development and grant-making) civic society actors to make local government more accountable, transparent and democratic. Co-PLAN has also initiated the KINDLE Advocacy program, supported by the American Embassy in Tirana, aiming at identifying and then supporting civic society groups, individuals and activists through training and coaching them during a full policy cycle for bringing forward causes relevant to public interest.

In addition to individual research and consultancy projects commissioned by various international agencies, research is always used in the ongoing projects, mainly in the form of feasibility studies, environmental assessments, and audits, focusing on planning, participatory processes, local governance, service provision, etc. The pioneering research for the Albanian context, is not necessarily (always) linked to a specific project. Often when the local context and developments

Fig5 / Ceremony of the street named after Co-PLAN
source / Co-PLAN archive

could benefit from any such concepts/ practices, Co-PLAN carries out research with own resources, trying to create a critical mass that will take the discussion to the next level, and ideally anchor the proposed (researched) concepts in current practices. Co-PLAN assembles this research into the dedicated policy-influencing publication: "Policy-followers or Policymakers".

Through its solid research-backed studies and reports, as well as knowledge extracted from direct field-work and involvement with the community, Co-PLAN has increasingly sought to influence policy-making within Albania. To this end, Co-PLAN has undertaken policy research aimed at generating policy recommendations, which are provided to stakeholders and main political parties in the form of Political Platforms. In April 2015, in anticipation to the local elections taking place in the country (in June), Co-PLAN prepared a platform of proposed policies for better management of the city and shared it with the candidates across the spectrum, media, and the general public. In March 2014, in the frame of the "Regional Development Program Northern Albania" project, Co-PLAN published an elaborate proposal on the "Regionalisation of Albania: The Governance, Administrative and Territorial Reform that Albania needs on a regional level" becoming a key contributor to the discussion on regionalisation, in an effort to to contribute to the modernisation and democratisation of governance in Albania. In May 2013, Co-PLAN prepared and shared "A Platform of Policies on Territorial Governance", preceding the parliamentary election campaign, held on June 23, 2013. The platform, which was circulated among the main political stakeholders, media representatives, donor organizations, and general public, provided a clear set of recommendations for a Good Territorial Governance, a good part of which were reflected in the government program.

Today, Co-PLAN is innately linked to POLIS University: It is part of the POLIS University Research and Development Institute, resulting in boosted expertise and research capabilities. Given the similarities in shared values, and mission, Co-PLAN and POLIS University align their collaborative efforts to bring about new developments such as the recently opened "Professional School of Energy Efficiency" (with the support of a TEMPUS funded project), the set-up of a dedicated energy efficiency laboratory within the POLIS University premises, etc. Clearly, Co-PLAN's history of growth and year-to-year experience might not be that of an ordinary straight Think Tank approach. Reflecting the natural evolution in response to the changing context, which later resulted into a formula of success, we have chosen to serve an important public good purpose, through a comprehensive approach: direct engagement in field-work through projects, and extensive follow up research particularly focusing on public policy, to conclude with clear recommendations for policy-influencing in the form of policy briefs, research papers, and why not…more good governance stimulating platforms!

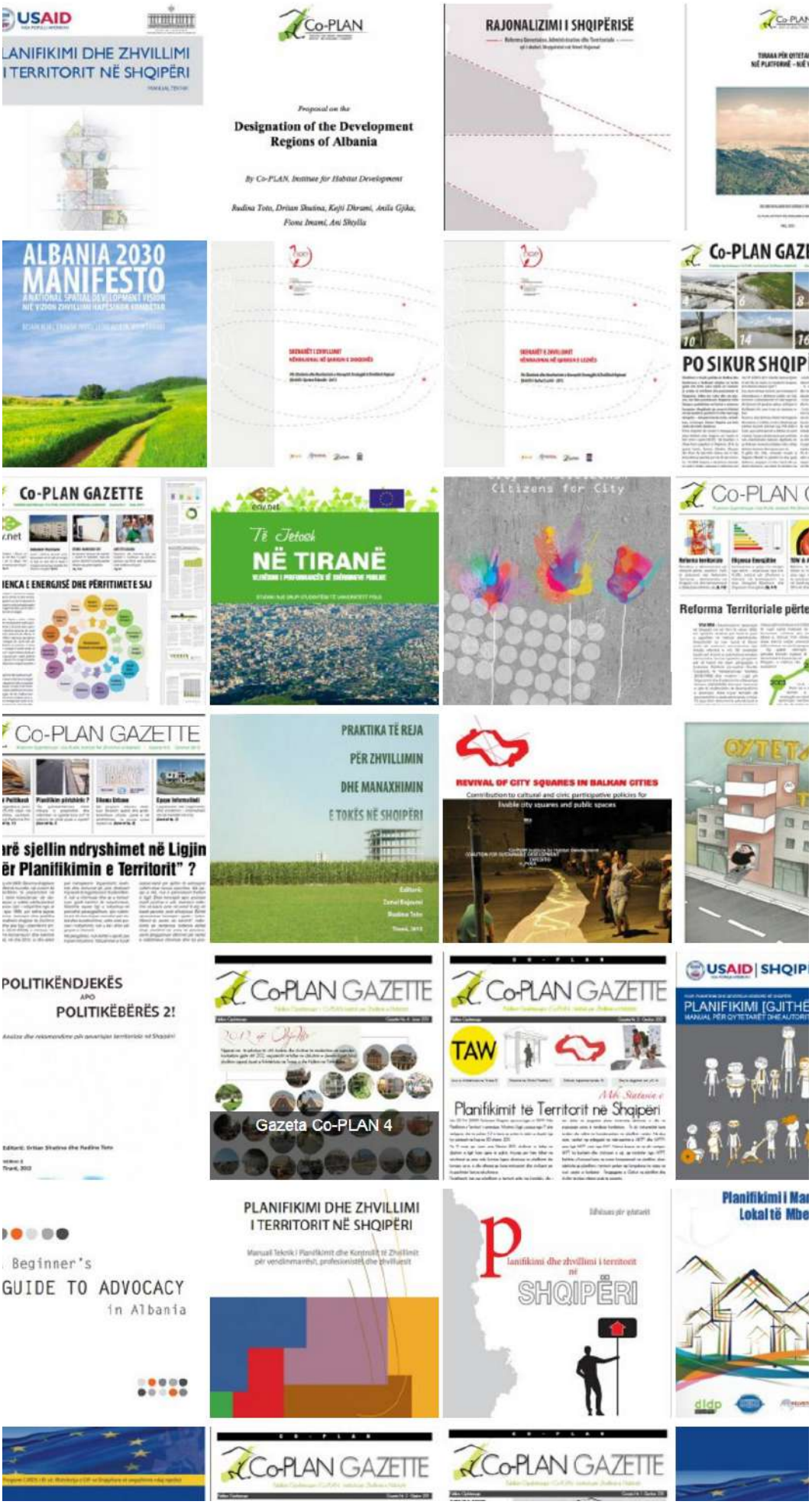


Fig6 / Co-PLAN publications and magazines
source / Co-PLAN

2
interdisciplinary exchanges

The Watershed and its Integrated Management and Planning

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Introduction

Planning has evolved overtime, from merely design to a complex platform of technical and political tools that aim to guarantee sustainable, liveable and resilient communities and habitats. As a result, planning covers a wide array of issues, objectives and territories, and the approach has developed to include scientific instruments and models and comprehensive analysis next to participatory actions, lobbying and advocacy for policy influencing. One of the most important developments in planning as a field of studies is the identification of environment as a key and integral dimension, thus leading to environmental planning, design and management.

Watershed planning and related methodological aspects constitute an important area of the environmental planning. By merely the terminology – "watershed planning", we understand two major factors that are implicit to the terms: i) the spatial scale and the system – the watershed, which is composed of a multitude of ecosystems and urban systems, thus having an intrinsic need for environmental thinking and actions; ii) the spatial planning methods and approaches – these should be combined and used jointly to address the complexity of planning challenges in a very complex spatial context.

Concepts and definitions on watershed and river basin

The definition of the watershed has evolved from literally a boundary/line of a watercourse drainage area, into "an area of land within which all waters flow to a single river system"(Heathcote, 2009). The UN conference of Water in Mar der Plata, March 1977, a landmark event in water management, defined that the problems of land and water scarcity and access should be dealt (among others) through integrated land and water management for multipurpose river basin development, taking place within national planning (United Nations, 1977). This is a historical definition as it lays out the basis for using planning as a platform, or overall framework, for discussing and solving issues related to natural resource management, specifically water and land resources. Following this global awareness-raising event, the UN conference of Rio de Janeiro in 1992, a forum of global environmental issues, resulted into global actions aiming at: integrated approaches for dealing with environmental challenges; management systems and not system components; management of water through locally responsible and efficient systems (United Nations, 1992).

Obviously, these objectives raise the need for using approaches that combine methodologies and analytical tools and promote stakeholders cooperation at different levels of the society and governance. A focus is likewise put on the preferred territory – the watershed as the "appropriate" geographical area for undertaking integrated spatial planning, with a strong environmental dimension. The watershed represents a broad system, composed of several smaller ecosystems

and institutional relationships and clues, where local management and decision-making add up, thus giving rise to a larger societal outcome with positive effects on the environment.

"Watersheds are biophysical systems that define the land surface that drains water and water-borne sediments, nutrients and chemical constituents to a point in the stream channel or a river defined by topographic boundaries. Watersheds are the surface landscape systems that transform precipitation into water flows to streams and rivers, most of which reach the oceans. Watersheds are the systems used to study the hydrological cycle and they help us understand how human activities influence components of the hydrologic cycle." (Brooks, Ffolliott, & Magner, 2012). Physically, the watershed is composed of the drainage network – i.e. the system of connected water channels in a tree like shape, the drainage basin – i.e. the area feeding water to the drainage network (Marsh, 2010) and the landscape – the entirety of ecosystems that are visible on the land and the entirety of functions that they carry out (Marsh, 2010). This implies that the aquatic system is interlinked with its terrestrial features (soil, geology, topography, biodiversity) and climate conditions (DeBarry, 2004).

Brooks et. al. 2012 defines the water as the common denominator of the watershed and its components, because: water reflects/mirrors the activity on land; upstream activities on land or in water affect the welfare of those living downstream; the quality and the quantity of water affects all natural and human-made cycles and events in the system; and the water [course] is basically and physically the backbone of the watershed system. As a result, the sustainability of the watershed as a system depends on its hydrologic equilibrium (DeBarry, 2004) and eventually on the relationship between water and the habitat.

The water drainage network in a watershed works based on a principle of stream order/hierarchy, with first order channels having no tributaries and flowing into the second order channels, the latter discharging into the third order and so on, till the main river flows usually into the sea. The knowledge on the relationship between the drainage network, the basin itself and the landscape is key to the watershed planning process and related [political] decision-making. It helps to identify and recognise constraints and values, as well as natural means for overcoming the obstacles that urban development causes to the balance of the ecosystems in the watershed. For instance, some of the key problems induced by urbanisation in natural sites of a watershed include storm water and flooding, increased water pollution downstream, soil ceiling and growth of the impervious surfaces, increased sedimentation and deposition, decreasing air quality and increasing erosion due to deforestation, landslides, loss of critical habitat, etc.

A key feature of the drainage network is its density, defined as the ratio of the overall length of the streams composing the drainage network with the area of the whole basin and measured in length/unit area. Higher densities show for increased steepness of the slopes in the whole, or different parts of the basin. This information, together with data on geology, biodiversity and soil, lead to the understanding of the river basin carrying capacity – the quantity and type of development that a basin can carry, without compromising ecosystem functions and risking environmental and ecological degradation. The knowledge of the watershed carrying capacity allows planners to make sound decisions on the appropriateness of developing the areas of the basin and the kind of development that is allowed to take place.

Planning outcomes differ across the basin, due to the distinct attributes that its three interrelated composing parts have. Thus, the first zone, the contributing one, receives most of the basin`s water and generates runoff. It is located in the upper outer part of the basin and as such it has rather gentle slopes and small and diffused surface flows. Therefore, it is the least susceptible to drainage problems (Marsh, 2010). This area is relatively peripheral in the watershed and the urban development pressures are rather low, or non-existent. Planners and decision-makers also tend to safeguard this area, due to its contribution in water replenishment and other important ecological functions. The other two zones, namely the collection zone and the conveyance zone are subject to drainage problems, though in different ways. The collection zone is also situated in the upper basin, but in its inner part and in periods of runoff is prone to inflooding (Marsh, 2010). The conveyance zone, on the other hand, contains the main stream-

Fig1 / A segment of the conveyance zone in the middle stream of Osumi River. Conversion of riparian areas into agriculture land leads towards erosion and flooding / source the author

channel and valley, with groundwater providing the stream base flow and surface waters and storm-flows derived mainly from the upper zones. Both, the collection zone and the conveyance one are more likely to be prone to urban development pressures, due to their location in the watershed, proximity to ground water and water sources, as well as ease of accessing communication networks. The conflicts between urban developments and the ecosystem functions that the watershed carries out in these areas are quite prominent and require continuously for innovative and integrated planning solutions.

The watershed landscape is composed of ecosystems; in other words it contains a multitude of "local networks of interacting plants and animals and the landscape in which they live" (United Nations, 2014) (ECE/TIM/SP/34). These interactions are mirrored into hundreds of biogeochemical and physical processes taking place in the ecosystem, named as ecosystem functions. Once these functions gain value and prove to be beneficial to users (humans or nature), they turn into services (Kareiva, Tallis, Ricketts, Daily, & Polasky, 2011). A watershed is exceptionally rich in multiple ecosystem services that, depending on the category they belong, may have a provisioning, regulating, cultural and supporting role. Each service, as the term implies, has a value for the users who are willing to pay for it, or sacrifice something else in return to a given service's benefits. The willingness to pay implies that humans are the beneficiaries and does not comprise the value of the ecosystem and its services to other users, i.e. other species and the ecosystem itself.

Calculating a total economic value for a given service is as yet a rather incomplete task, though it may involve different types of values (direct, indirect, etc.), as it merely consists of the concept of ecosystem value as humans understand and use it. Any attempt to consider ecosystem value for itself, or inherent value as (Beatley, 1994) defines it (Randolph, 2004), remains however unilateral as long as it is human-driven and based on human reasoning. Regardless of its incompleteness, having to know the economic value of ecosystem services in a watershed is key to an informed planning decision-making. It provides input to the benefits and costs analysis, by adding external benefits to the comparison of land use/development alternatives and making the whole analytical process more comprehensive and representative. It also increases the acceptability of the planning process, by showing that rather than forecasting future, planning builds up future in an informed way and based on evidences.

The Integrated Planning Approach

The analysis that precedes watershed planning and management should entail interpretation of the biophysical interrelations between the water network, the basin area and the ecosystems, and of the values of the natural capital, as shortly described above. This will guarantee that ecosystem management goals and their sustainability are accomplished at a watershed scale, as DeBerry (2004) suggests, thus leading to achievement

of sustainable watershed environmental planning. Because the system is extremely complex, with ecosystems and related services in continuous conflict with human-made developments that do not necessarily recognise the natural hydrology defining the watershed as a spatial unit, it is necessary for the analysis first and then planning to embrace the comprehensive approach. The latter, although a strategy that is increasingly advocated in the literature, remain still a relatively new concept (Heathcote, 2009) in terms of implementation.

The comprehensive approach should integrate the aimed stability and resilience of natural system's components with social and institutional objectives, leading to integrated watershed planning and management. The physical facts/features of the watershed and the political realities have to be brought together to achieve integrated watershed management (Brooks, Ffolliott, & Magner, 2012). All practices can be embedded in the integrated spatial planning framework, based on issues confronted by different water managers at international level (Heathcote, 2009):

- Water availability, requirement and use;
- Water management and institutions;
- Water quality.

1. Discussions and studies on water availability, requirements and use, include a large array of aspects, such as water extraction for drinking and other uses, including waterborne commerce; management of extreme events such as floods and draughts and any other impact resulting from climate change; protection of aquatic and wetland habitat; forecast, prevention, management and mitigation of climate change occurrences and effects (Heathcote, 2009). Land use planning is vital to governing water use, through, among others, designation of sites and properties for locating residential blocks, industrial zones, recreational activities, and forestry and agricultural processes. All these sectors have different water consumption necessities, which impact the infrastructural system of water supply/distribution and relate strongly to the availability of water sources in terms of location, quantity and quality. "In fact, water stress is the result of conflicting water uses or requirements… Furthermore, economic demands conflict with other uses."(Kissling-Näf & Kuks, 2004).

Rates of water extraction for drinking water or other industrial uses should be planed so as to maintain a balance with replenishment rates (Ostrom, 1990). The exceeding extraction rates will not only decrease the available quantity of water at the respective source; it could also increase the potential for salt water intrusion, if the water sources are in/close to a coastal area, thus affecting quality next to quantity. The construction of hydropower plants is deemed important for economic development, non-polluting energy production and fostering of energy independency. Yet, on the other hand, it affects negatively the biodiversity of the water source and the surrounding ecosystem; it decreases quantities supplied to local residents in the rural areas; and increases the chances for desertification and coastal areas alteration.

Next to the use of land, the type of property right associated to water sources and the corresponding plot is also a factor in favour of conflict mitigation or exacerbation. The ownership of a water source is often related to the ownership of land, while the ownership of the major water systems, such as lakes, rivers and their basins, coastal waters, estuaries, etc. is often not related to land ownership (Kissling-Näf & Kuks, 2004). Therefore, particular resources are owned privately or in common, with also cases of non-full ownership that results in a set of rights from the overall bunch of property rights. On the other hand, the major water systems are usually considered a public natural resource and owned by the governments. Nevertheless, whether one type of property or the other, this depends on the property rights [re]distribution and legal system of a country. As a result, the level of complexity in managing the water source and defining appropriate level of use and extraction, while also coping with rivalries on the source and on effects of the sources use on ecosystems, will depend on the specific context-based legal framework.

2. Institutional and legal frame for the management of water and other natural resources: The planning framework is key to this dimension as it provides the grounds for integrating territory and natural resources into a common management platform as of the outset, where regional agencies in particular can play a crucial implementation and management role. If the planning system takes a merely physical and urban approach, then it will disregard the vertical and horizontal integration among development sectors and their effects on the territory. Water issues should not

be dealt with simply through a sector's perspective, but in relation to the territory, the ecosystems and their services. This calls for an integrated planning approach. Heathcote (2009) defines that water management strategies have often failed because of not incorporating the full range of stakeholders' values and perspectives on water. As cited in Heathcote (2009), "Wilkes (1975) Van Ast (1999) and King et. al. (2003) note that the success of many major basin projects has been hampered, because different agencies are responsible for water supply and for water quality, and the two are not always effectively coordinated."

The integrated approach also places a particular focus on the region as an intermediate and rather elusive space, which can be dynamically modified to comprise multiple ecosystems and administrative territories in a spatial combination that is suitable to achieve both political/institutional and ecosystem objectives. The watershed is the natural region that can respond to this aim.

The planning approach will also address financial issues, next to the study of costs and benefits, ownership issues and institutional arrangements to guarantee property rights on land and other resources, and also the organization of infrastructure systems and urban structures, considering that the latter make use of and directly affect the natural landscape. The institutional and legal framework is very broad and complex as it covers both sectorial and cross-sectorial aspects and it also contains the procedures for decision-making. This frame does not limit to public institutions and procedures only; it rather considers carefully also the institutional dynamics of the communities that exist within the watershed boundaries, the interactions that exist among them and the incentives (Gregersen, Ffolliott, & Brooks, 2007) and/or coercion that steers stakeholders' behaviour.

Institutional arrangements have the challenge of dealing with the various conflicting interests that could be summarised as the potential conflicts of the sustainability 3E's objectives, as Scott Campbell (1996) suggests: i) the property conflict between economic development and the equitable distribution of opportunities; ii) the resource conflict between economic development and environmental values; and iii) the development conflict between equity and environment (Campbell, 1996). To address these challenges, planning uses various mechanisms, such as strategizing, regulatory and monitoring ones, fiscal and financial, and public investments (Gregersen, Ffolliott, & Brooks, 2007). The successful implementation of these mechanisms depends among others on the degree and level of stakeholders' participation as off the planning process and the cooperation among and within them during implementation of watershed management actions.

3. Quality of water and other natural resources: As Eswaran et. al. 1995 defines, "the health of the watershed determines the health of a nation. Poor ecosystem management has and will result in the impair functioning of the watershed, which in fragile environments can lead to ecosystem collapse" (Jagir & Eswaran, 2000). The quality of water sources (coastal, oceans, lakes, rivers and reservoirs) cannot be sustained without a guarantee on the vigour of ecosystems. Protecting and restoring water resources can be achieved through management of pollution sources (point/non-point) and of other factors that jeopardise the quality of water bodies, as well as through strategies and actions that point at ecosystem elements, or other natural resources, in close connection to land uses.

For instance, referring to Gregersen et. al., 2007, rain-fed and dispersed agricultural cropping is a common land use in many upstream watersheds. While individual contributions resulting from it to the economy and the ecosystem are relatively small, the aggregate contribution is very significant. Intensive agriculture on the other hand has yet a bigger impact, though mainly in the lower lands, by transforming large natural areas into agricultural ones and substantially increasing the amount of agriculture-borne nutrients that percolate soil and contaminate groundwater. Therefore, not only agriculture lands expansion results in loss, or modification of biodiversity, but it also loads water sources with chemicals and other pollutants that infiltrate the soil through water from precipitation, or irrigation practices.

However, next to agriculture, there are also the unsustainable forestry practices, livestock over-grazing and urbanization tendencies that altogether alter the habitat, cause harm to the ecosystems in a watershed and stimulate further climate change occurrences. The latter cause an increase of fresh and salt-water temperature, hence threatening cold-

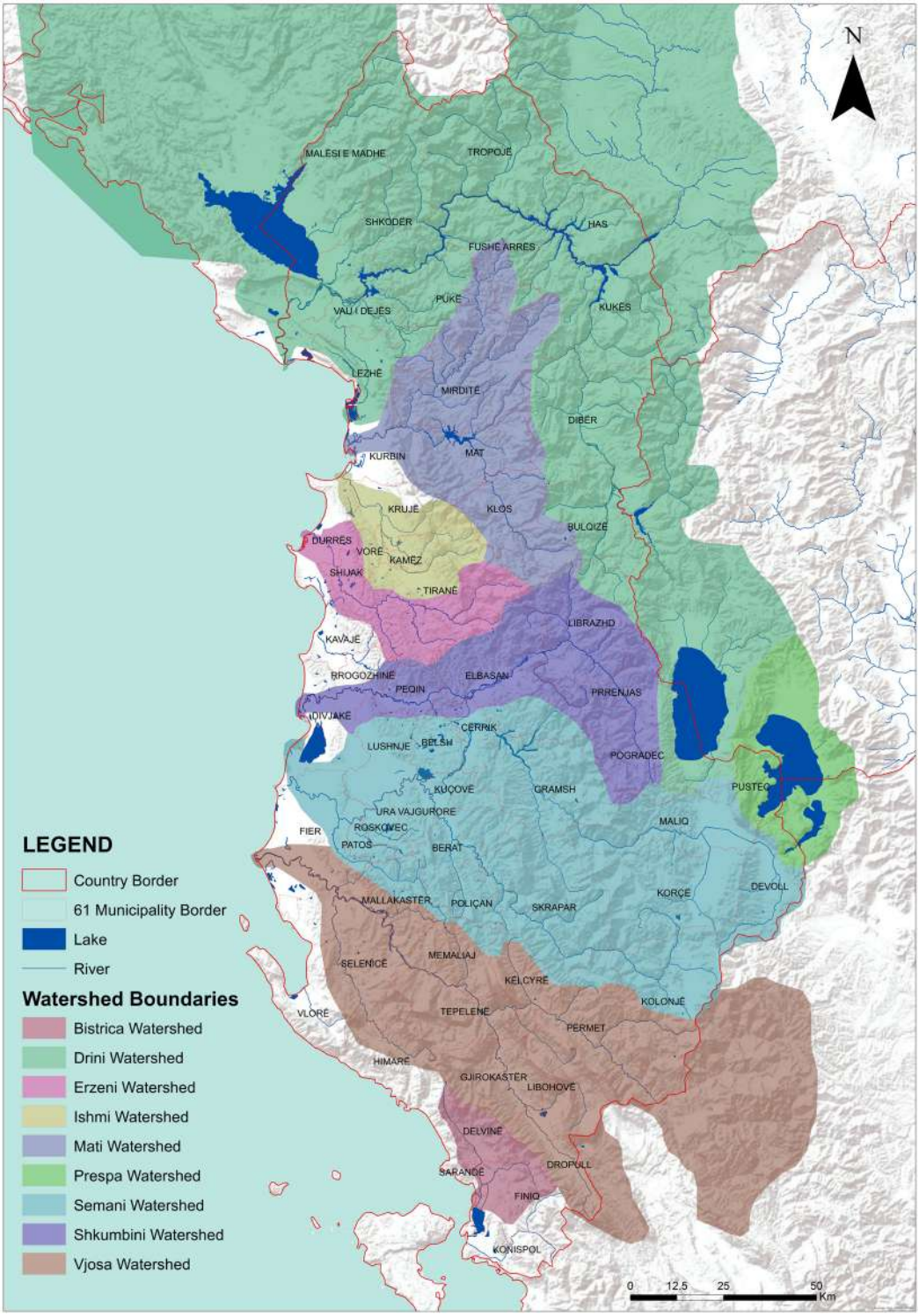

Fig2 / The map of the official river basins of Albania source / ASIG Albania and author's GIS processing

water fish habitats (Marion, et al., 2014), local climates and other species that depend on certain weather conditions. Climate warming will result into worsening qualities of water sources, thus not only lowering the response to demand for clean and qualitative water – for instance the increase of salinity in the coastal fresh water systems is likely to increase due to sea levels rising followed by seawater intrusion (Marion, et al., 2014), but harming the biodiversity as well.

Overstocking livestock can cause eventual losses of high value forage and species, compaction of the soil and therefore reduced infiltration of surface water and overflows on land (Gregersen, Ffolliott, & Brooks, 2007). This activity happens mainly in the upper (first) zone of the watershed area, according to Marsh 2010, but its effects are felt in all three zones. Similarly, wrong forestry practices, deforestation and unsustainable forest management can impact any of the three watershed zones, depending of the forest location, through decreasing water infiltration, diminishing evapo-transpiration rates and holding back

Fig3 / Coastal erosion and seawater intrusion into agriculture land – the coast of Fier, Albania source / the author

groundwater purification, next to loss of biodiversity, and will increase perils from soil erosion and land-slides.

Erosion, beyond posing a risk for settlements when close, has a critical impact on the quality of water and transforms water bodies, due to sediment created by surface erosion (carried through precipitation and surface runoff). Further on, the expansion of urban surfaces causes the soil sealing phenomena to augment, resulting into storm water floods, extreme reduction of evapotranspiration, cutbacks in groundwater recharges, and in case of poor waste water management, also increased pollution loads into ground and surface waters.

While dealing with the above components, the process of integrated planning at watershed level has to fulfil a set of objectives and follow a number of steps. One could look at the watershed management objectives in a cascade fashion, with overarching aims representing the integrated approach and subsequent specific objectives, focusing on sectors, ecosystems, or natural resources, so a to give way to the concrete actions for watershed development, protection and restoration. There are three interconnected overarching aims: i) achievement of sustainable water governance for sufficient supply of qualitative water for years and generations to come; ii) sustenance of social, economic and land developments for short and long term periods; iii) fuelling of ecological resilient territories and communities. The specific objectives that come out of this overarching frame, will bring watershed management into numerous directions of planning and stakeholder involvement, depending on the variety of natural resources, property rights and institutional organizational systems that manage these resources, together with territories and development sectors.

For instance, Gregersen et al. (2007) summarises the watershed objectives based on Brooks et al. (1990), as the following: i) Maintain and or increase land productivity; ii) Assure adequate quantities and quality of usable water; iii) Reduce flooding and flood damage; iv) Reduce erosion and incidence of land-slides; Reduce downstream sediment delivery. [Government] Agencies also define goals for watershed management that depending on the institutional and jurisdictional organization can vary from strictly water related, to restoration of ecological balance by harnessing, conserving and developing degraded natural resources (Government of India, Ministry of Rural Development, Department of Land Resources), and further more to overall territorial governance as a means for balanced management of human activities and natural resources (Conservation Ontario, 2010).

The steps for conducting an integrated watershed planning process are summarised as adapted from Heathcote (2009) and Randolph (2004):

- Inventory and analysis,
- Identification of problems and prioritization,

Fig4 / The contributing zone of Shkumbini river in the Shebenik Mountain source / the author

- Setting the goals,
- Development of the planning scenarios,
- Screening and evaluation of the management options,
- Development of strategies, actions and procedures.

Inventory and analysis includes the understanding of watershed components, including their features, processes and uses; of stakeholders, institutions and related interests; and finally of space and territorial boundaries of study. Watershed components and stakeholders are broadly discussed above. As far as boundaries are concerned, it is crucial to set the territorial scale from the outset, because the complexity of the water drainage network, basin and landscape escalates with the increase of space. The terms watershed, basin and catchment areas are often used interchangeably in literature (Lal, 2000). However, for the sake of this paper, the definition of the spatial difference between the watershed and the river basin shall be understood according Gregersen et. al: "We refer to a river basin as a large unit of land that drains into an ocean. The term watershed is used to refer to smaller units that contain all lands and waterways that drain to a given common point. A river basin can, therefore, contain many watersheds within its boundaries." (Gregersen, Ffolliott, & Brooks, 2007). So far, literature shows that seems to be easier managing natural resources at their individual scales, at ecosystem level, or at a micro watershed scale. Increasing the territorial scale proliferates significantly the challenge for managing natural resources, due to the arising complexity of biological processes and interrelationships and contradictions on power jurisdictions (local, national, and regional).

This phase will achieve the establishment of the watershed environmental inventory and an analysis of the social, economic and environmental state of the art in the watershed area. The inventory is usually set in a geographical platform, thus consisting of a GIS dataset of natural and socio-economic factors, including land use (Randolph, 2004), that allows for in-depth analysis if the watershed. The analysis will start with a rapid assessment, consisting mainly on data and facts interpretation to conclude with detailed assessments of the current situation, leading to identification of problems.

The identification of problems is attained through both, the rapid and thorough analysis carried out in the first step, as well as through stakeholder consultation. The latter is crosscutting to the whole planning process and it is organised in a way that targets all stakeholders and their interests. Problems relate mainly to the use and wellbeing of the natural resources, their interaction with the human made interventions and urban settlements, property rights on natural resources, as well as institutional and legal frame aspects that need to be revised to ensure resiliency of the watershed (and all of its ecosystems) and sustainable development.

Prioritization of problems leads immediately to the goals setting step and subsequently to the development of the

planning scenarios, which not only reveal constrains, but first and foremost propose strategic interventions and decision-making criteria. The criteria are especially used in the screening and evaluation of the management options. The latter is multidimensional as it involves a number of tools, such as benefit-cost analysis, [strategic] environmental [impact] assessments including social impact assessment, risk assessment, institutional assessment, etc. The criteria are also multiple and given different weights, ranging from economic to social, environmental, ecological, territorial, institutional, cultural, political governance, and design criteria.

The last but not least, the designation of strategies, actions and procedures leads towards management, aiming at organizing and guiding use of land, water and other natural resources of the watershed to provide desired goods and services to people without affecting adversely soil and water resources (Brooks, Ffolliott, & Magner, 2012). The "integration" dimension is exceptionally strong in this step as the strategy actions and corresponding regulations consider the needs of all sectors (economy, agriculture, natural resources protection, industry, etc.) and carefully recognise the interrelationships among land use, soil, water and the location of the different areas relative to the stream (Brooks, Ffolliott, & Magner, 2012).

On a practical level, there are two major approaches used in managing the watershed problems: the structural and the non-structural methods. These may be used separately, or with some crossover, depending on the watershed management objectives, costs and stakeholders` interests. Non-structural best management practices (BMPs) do not usually include construction of facilities; they rather consist of some types of planning, design and vegetation measures. For instance, regional planning and transit-oriented development (Calthorpe, 1993), (Carlton, 2007), design with nature (McHarg, 1992), conservation design, etc. provide solutions and incentives for the protection of natural resources. Similarly, fertilizer and pesticide application control, vegetative filter strips and barriers on agriculture land, impervious area reductions, dune restoration and management, preservation and/or restoration of environmentally sensitive areas such as wetlands, lagoons, riparian corridors, etc. all constitute environmentally friendly practices that protect the watershed. On the other hand, structural BMPs include measures and construction of physical structures to control water quality, have usually higher costs than non-structural ones, but may be able to achieve a significant result in shorter time. Nevertheless, these BMPs are successful in terms of achieving their specific target, but may have other adverse environmental and visual effects, as for instance with sea walls and dykes, etc.

Conclusions

The watershed is a complex territorial unit built around a water body and defined by its stream channel and affluents, the composing landscape and the related ecosystem services. The term can be interchangeably used for river basin, though the latter means an entirety of watersheds, draining into a main river that will finally discharge into the sea. Consequently, the meaning and the scale attributed to the term, will impact the complexity of the interrelationships that rule over the watershed area. Because these interrelationships represent a multitude of interests, values and development perspectives, next to ecosystem values per se, the watershed needs to be planned for and managed in an integral fashion and through comprehensive, yet practical and targeted instruments.

The approach that scientists and academics propose is that of integrated watershed planning and management. This approach is widely accepted at a theoretical level, but still weak in terms of implementation and use by government agencies. A major factor behind remains the power struggle among different agencies and stakeholders over a limited number of resources, located within one single territory, together with property rights rivalries and low understanding of the cause-effect chains of poor, unilateral and narrow-minded natural resources management.

Integrated watershed planning and management embarks on three interconnected overarching aims that bring together water governance, social-economic and land development and ecological resiliency. The specific objectives address target issues through targeted instruments.
Practices used for managing watersheds are often divided into structural and non-structural ones, with the previous

consisting of costly and effective but often environmentally disruptive technological solutions, and the latter being environmentally friendly, soft and mainly ecological interventions of a preventive nature, with an arguable efficiency. The choice between the two is of a managerial and political nature, based on benefit-cost analysis, presumably including externalities and ecosystem services valuation.

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Protection and Restoration of Biodiversity of Semani basin

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Introduction

The Semani River and its basin are important assets for Albania with dense inhabitant centers and rich natural resources, holding high biodiversity with endemic plant and wildlife species. The National Park of Tomorri and Fir of Drenove, Osumi Canyon and Nature Monuments hold outstanding value.

In this paper, the selected appropriate theories applied in biodiversity are described as well as the methodology used regarding the issues related to Seman watershed: deforestation, soil erosion and sedimentation; flooding and pollution which have affected the preservation of biodiversity and sustainability of the natural resources management.

This paper aims in suggesting recommendations regarding preparation of integrated management plan for the Semani watershed, erosion control and sedimentation, protection of forests and waters. Nevertheless some of the recommendations focus on the avoidance of new construction of dams on the areas holding valuable biodiversity. Thus, recommendation are set up to urge new system focusing on the ecosystem services and climate change adaptation measures; wise use of natural resources, in particular water resources and reduction of their pollution; people awareness on natural resources and biodiversity protection.

Main characteristics of Semani Basin

Semani River is formed by Devolli and Osumi tributaries joining in Kozara, where after joining the Gjanica River; it crosses the Myzeqe Plain and flows to the Adriatic Sea. Its basin has a surface of 5649km^2. Some characteristics of the river are (Pano, 1990: 221):

- length 281km;
- annual discharge volume 5649 million m^3;
- average water discharge 96m3/s;
- total sediment load transported to the sea 31,2 million t/yr;
- turbidity 4390g/m^3;
- flow module of the sediment discharge in the surface of catchment 2340t/km^2;
- average altitude of the watershed 863m (or two times more than the average of Europe).

The Semani basin represents a high diversity in its relief; climate and soil; landscape and biological diversity. The watershed relief includes the littoral, waste plains, hilly chains and high mountains. The coastal lowland has typical Mediterranean climate, while the highlands have a Mediterranean continental climate. Regarding the topologyes of soil, in the lowland area there are alluvial soils; grey-brown soils of altitudes up to 600m; brown mountainous soils of altitudes from 600 to 1000m; grey forest soils from 1000 to 1800m; and mountain meadow soils occuring at altitudes of 1600–2600 m (Zdruli, Lushaj, 2008: 73). During the centralized economy, vast hilly areas were deforested and opened for agricultural use, were part of them at present time where abandoned and degraded by erosion.

Main theories

Through the Theory of biodiversity, some of the components of biodiversity of

Fig1 / Semani pine forest
source / the author

Semani basin are explained, including here also a great number of species and ecosystems (coniferous forest, shrubs and wetlands, plant and animal species). Biodiversity surveys are undertaken to find out what organisms exist in a given area, for monitoring endangered populations, evaluating conservation priorities and bioprospecting.
According to the Private Property Theory, the management of natural resources (forests, pastures, flora and fauna) by the commons leads inevitably to tragedy, free riding on the resource, and finally their destruction (Hardin, 1968:1243). Thus, in order to avert this, the options available are either privatization, or holding them as public assets, regulating the right of access to the natural resources through allocation.
In fact, there are good practices where forests and pastures traditionally are used in common by the village; or plots used by families which are very well protected and used without being legally seen as their properties. In such cases, the traditional law and the village council of elders have been the regulatory mechanisms for the protection and good management of the natural resources within their territory.

Methodology of study

Methodology of study included an explorative research, highlighting key elements within the relationship between people and biodiversity, explaining why these interactions happen the way they do. Therefore, qualitative methods are used in which tried to discover concepts and relationships of the collected data.
The methodology is based on investigations and assessments concerning the biodiversity and natural resources use and protection, problems faced, and the best management practices identified in the field. The map of watershed with diverse land use category has been studied, as well as visual interpretation of ortophoto's and records where gained during the field visits and existing literature.

Biodiversity of Semani basin

The Semani basin is rich in species, ecosystems and habitats. Along the coastline wetland, sand dunes and river delta with typical flora and fauna are apparent. The Mediterranean forest and shrubs zone includes pines (Pinus halepensis, P. pinea and P. marittima), a dense understory of shrubs composed of myrtle, dogwood, etc., with lianes over trees and other herbaceous plants.
The alluvial natural forest and riparian vegetation on riverbanks is composed by poplars (Populus alba and P. nigra), alder (Alnus glutinosa), ash (Fraxinus angustifolia), oak (Quercus robur), elm (Ulmus minor), etc.

The hilly area partly has been deforested and transformed into agricultural land, olive groves, fruit trees or vineyards. The agricultural land situated in along the hills of this area is heavily eroded. Partly, the area is covered by natural vegetation, shrubs of "Mediterranean makia" (Pistacia lentiscus, Arbutus unedo, Phyllirea angustifolia, Myrtus communis, Cercis siliquastrum, Rhamnus alaternus, Viburnum tinus, Lonicera etrusca, Cistus

incanus etc. The formations of kermes oak (Quercus coccifera) or Spanish broom (Spartium junceum) indicate a stage of degradation because they have replaced the foster broadleaved forests, due to overexploitation, intense uncontrolled grazing and fires.

Most of the forests are concentrated in the hilly and mountainous areas, composed of oak species: Quercus frainetto, Q. cerris, Q. pubescens, Q. petraea, Q. trojana; or mixed ones with Carpinus orientalis, Ostrya carpinifolia, Fraxinus angustifolia, Castanea sativa etc. The understorey is rich in shrub species like Juniperus oxycedrus, Erica arborea, Paliurus spina-christi, Crataegus ssp., Cotinus coggygria, Prunus spinosa, Coromila emerus, and many grass species.
Above the oak zone grow beech forests, fir, black pine, Heldreich pine, accompanied by shrubs and some endemic, sub-endemic or Balkanic species. The mountain alpine forest ecosystems comprise species like Pinus mugo, Pinus peuce, Populus tremula, diverse shrubs and rich grass flora.

Within the watershed there are threatened species (Macedonian fir, white fir, horse chestnut, stone pine, Alepo pine, juniper etc.; threatended habitats (estuaries, coastal dunes with Juniperus spp., wooded dunes with Pinus pinea, Alpine rivers and the herbaceous vegetation along their banks, lakes of gypsum carst, beech forests, sub-thermophilous (Quercus) woods, etc. (Vangjeli, 1994:169)
Among the most important places for biodiversity conservation are the: The National Park of Tomorri and Morava Protected Landscape. Of special value is also the Osumi Canyon, favored for rafting, as well as other natural monuments.

The Fauna of the lowland is rich and diverse with different species of birds (wild ducks and geese), field partridge, quail, turtle, dove, maritime eagle, amphibians and reptiles, whereas the river mouth is one of the favored places for its waterfowl, holding also water birds. The forests are home to big mammals such as the wolf, brown bear, chamois, boar, roe deer, fox, badger, hare etc.

However, a high number of fauna species are threatened or classified as endangered species. Thus, the moratorium of hunting of two years time-length issued by the Parliament has had some positive impact on increasing the population of diverse species of fauna.

Problems related to the basin

Erosion and sedimentation is caused by poor land use practices, deforestation, overharvesting, overgrazing and gravel mining.

Water quality is degrading as a result of industrialization, agricultural, and municipal pollution, where air quality issues have largely resulting as a factor from industrial pollution,
and Flooding mostly in the lower portion of the river system is increasing.
It is estimated that the loss of soil in Albania varies in an average from 25-40t/ha/yr. But, in Tomorrica (part of Semani Basin) it can be 18,000t/ha/yr, which is considered as amongst the most degraded and deserted areas of the country. The carrying capacity of irrigation reservoirs is reduced by 4% per year because of filling with sediments (1.5-2% was previously). Also, each year at national level the loss from agricultural land is to 40t/ha of soil and in places susceptible to erosion to 100t/ha/yr. (Lushaj et al, 2011: 214).

The added problems to erosion: damage of forests, water use, natural factors (great slopes of the terrain, climatic conditions with rainfall concentrated in the period of winter with high intensity, soil characteristics, dense hydrographic network–irregular gravel mining, sparse vegetation cover), human factors - interventions for economic activities (land use, lack of investments for protection from erosion, excessive logging, overgrazing, inappropriate agricultural practices).
According to a study (Bedini, E., 2007:9), aproximatively 500ha of land has been eroded and 112ha has been created mainly due to sedimentation of the material removed from the abandoned delta of Semani River. Between 1989 and 2001, the erosive situation has practically destroyed the sand spit of the Godulla lagoon. Along the part with a length of about 1300 m, between 1977-1981, the sea advanced for about 450m (with a rate of 150m/year), between 1981-1989 the sea advanced for about 430m (a rate of more than 50m/year) and between 1989-2001 the sea advanced for about 420m (a rate of 35m/year). These rates can decrease available soil depth for agricultural production and cause surface water pollution (rivers, lakes, lagoons, etc.).

Consequently, erosion is not only a social-economic problem but also an ecological one. Erosion and sedimentation of the landscape is extremely high and it is an

Fig2 / The erosion of Semani seashore
source / the author

ongoing process. In addition, the frequency of flooding and the negative impacts of sediment deposition are on the increase.

The most significant factor contributing to the increased flooding and sediment problems is related to river instability; which is caused by deforestation and gravel mining. The degraded river is meandering, or moving laterally; cutting banks and causing more erosion, where all of this contributes to the increased flooding and sedimentation.
In the last few years the flooding is favored as result of the interventions in the riverbed for gravel mining, illegal forest cutting and destruction of dikes.
In mountainous areas with sparsely population even without sewage systems, the problems of river pollution are overcome easy through self-cleaning ability of the river.

Because of the changes on hydrologic regime, during the last century, the river has changed 5 to 6 times its river mouth, within in a wide range of about 25km long (Pano and Frasheri, 2002:152). On the other hand, the river mouth itself faces various types of pollution, including those from oil-extraction waste, and a lack of integrated coastal management.
Evaluation of the water quality based on the values of physical-chemical parameters and heavy metals, the Osum and Seman are deemed as heavy polluted, while Gjanica is extremely polluted. Passing through the city of Fier before joining with Semani, it also collects urban waste, leaving its water without any form of life. It is estimated that every month in Gjanica flows around 12587-18091 m3 liquid waste containing hydrocarbon and industrial oils (Abazi, 2013: 2228). Besides damage to natural aquatic flora and fauna, the water use for irrigation and farming is very risky.

Construction of hydropower plants as shown in fig. 4 (9 in Devoll, 1 in Tomorrica and 3 in Osum), all in ecologically valuable areas of "very high" and in "high" conservation value, (FLAVIUS, 2010-2014: 12) including the destruction of famous Osumi River canions, are a current threat to the natural heritage of Semani watershed, with a significant impact on the river ecosystem and the longitudinal continuum for living organisms and sediments leading to loss of ecological integrity, river degradation, and consequently a decrease in biodiversity.

Developing and using ecologically sustainable alternative sources such as solar and wind power is particularly high in this country. While river landscapes of highest conservation value should not be developed at all, those of lesser value are not necessarily recommendable for development.
Hydropower dams have a significant impact on the longitudinal river continuum for biota and sediments, leading to a loss of ecological integrity, which means lower biodiversity (e.g. migratory species) and species abundance, and serious river degradation processes downstream of dams (channel incision).
Construction of Gas Trans Adriatic Pipeline

Fig3 / Trees uprooted by sea erosion
source / the author

– TAP is another current threat. For the Semani watershed, within 500 meters of the route corridor of the TAP project affected land were identified in total, 5,730 hectares of agricultural land, 2,850 hectares of forest, 1,400 ha of pastures and 347 ha of urban area. The pipeline passes through some natural reserves and monuments of nature, and the last 2.7 km before entering the sea through the estuary of Seman-Pishë Poro, which is a CORINE biotope, all these of major importance for nature conservation. (Plani Kombetar per Projektin TAP).

Problems related to biodiversity

The consequences of various human activities in Semani watershed (intensive agriculture, overgrazing, uncontrolled industry, and unplanned urbanization), destruction of dunes, forest fires, sea erosion and a variety of other human-induced stresses have taken their toll on ecosystems acting against preservation of biodiversity and sustainable natural resources management.

One of the most imminent conflicts to be avoided is the one between a high number of planned hydropower stations and the goal to maintain the high ecological value of river systems. Hydropower dams modify the entire river landscapes, leading to loss of characteristic, endangered habitats and species, interrupting river corridors, hamper sediment transport and produce channel degradation further downstream. Dams disconnect the river continuum for living organisms. Fish passes can only reduce this effect to a certain degree and are not feasible for all projects, in particular for dams higher than 20 m. Preventing damage to river systems today will save future costs of measures to improve the ecological status and will preserve the last "river jewels" of the continent for generations to come.

Therefore priority should not be given to building new hydropower dams but upgrading existing ones and lowering energy demand by increasing the energy efficiency, for which the potential in our country is known.
Climate changes. It is observed that the climate warming stands at 1.20C in the whole country, associated with the decreased of rainfall with 200-400 mm, reducing wind speed by about 1.5 m/s and 5% moisture. The influence of heat is felt in the country's water system, the water resources and to increase the intensity of erosion processes. Climate projections for the future show that Albania will face these phenomena (Komunikimi i dyte kombetar, 2009: 80):
- A 20C increase average annual temperature in winter and summer until 2049;
- The average rainfall decline by 8% until 2049.
The temperatures are expected to occur during the summer months (June-August). The significant impacts are expected to exercise greater pressure on biodiversity and the population.

Challenges for the future for climate change include the integration of climate change when the planning sector strategies in

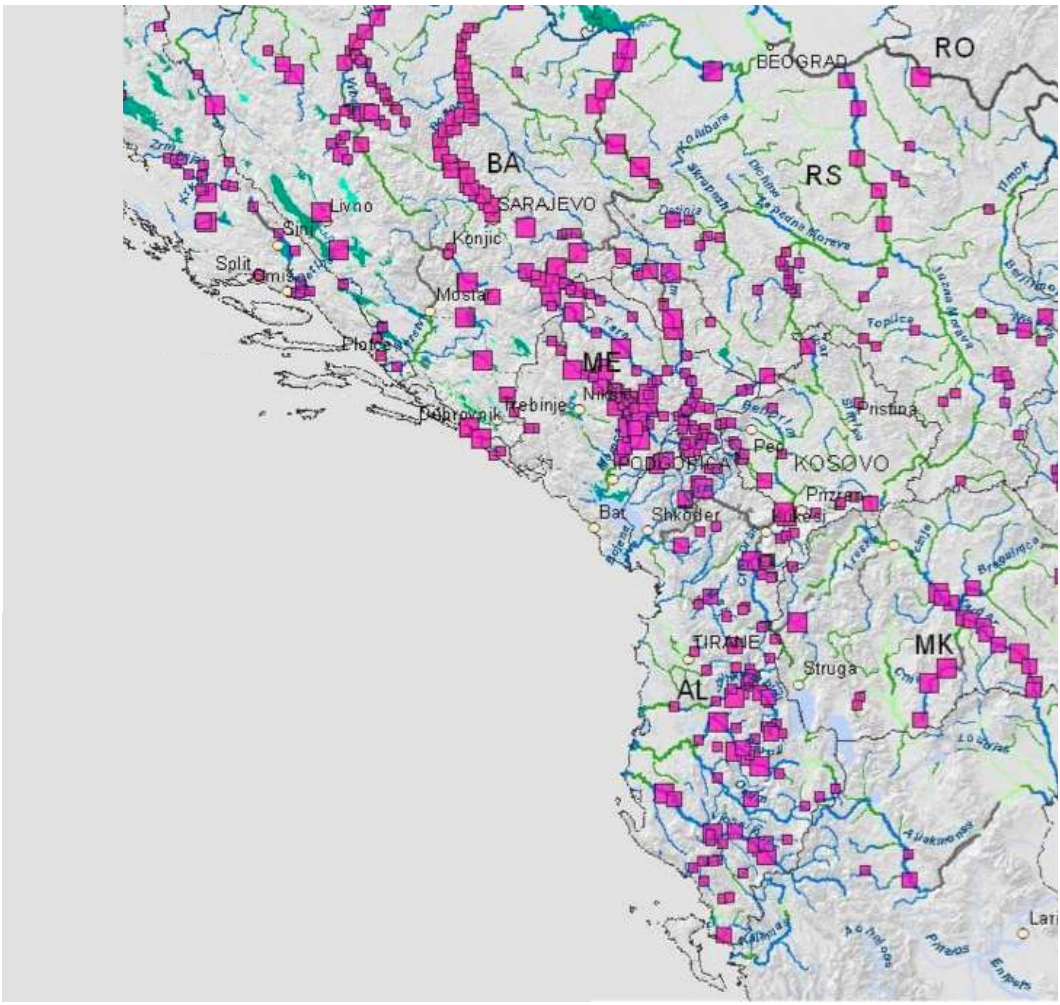

Fig4 / The planned hydropower plants for Devoll and Osum that would affect very high, high and low conservation stretches. source / Flavius (2014)

the field of health and social policies, agriculture and forestry, biodiversity and ecosystems, marine and coastal areas, water and production systems. Support for the development of forestry; development of management plans across river basins; rehabilitation of damaged riverbeds by 25% by 2020; increasing the surface of protected areas in 17% of the territory through the enhancement and integrated management of Protected Areas; establishment of the ecological network "Natura 2000"; provision of conservation status for 5% of threatened species and habitats. (Strategjia ndërsektoriale e mjedisit).

Possible rehabilitation measures

For the biodiversity conservation is particularly important the extension of protected areas in order to ensure the representation of all types of ecosystems in the network of these areas. Objective was to establish the network of protected areas 17% of the territory.

In addition to problems inherited from the past, it is noted that the current situation is partially due to the lack of policies and inappropriate legal system, lack of clear property titles and failure of the current legislation. A special law is the 10-year moratorium on industrial logging. The legislation should allow further decentralization of forest management, transferring the public forests for use and ownership to the traditional users, villages and farming families. Our country should not only continue the path to approximate the legislation of the sector with acquis communautaire, but also to ensure its implementation in practice, as the only way to successfully meet the integration process in the European Union.

Biodiversity can be increased by restoring damaged ecosystems; providing additional habitat for rare, threatened, or endangered species; establishing additional ecological reserves; planting selected species on contaminated areas that immobilize the chemicals within the site, and accelerate degradation of the compounds into less harmful materials. Valuable trees, riverine and seashore woodlands should be protected. The road construction works should be kept to its minimum near rivers, streams and canals. Urban development should be controlled.

Fig5 / Destruction of dunes
source / the author

Some good management practices can be extended specifically in mountainous and plain areas, including preparation of restoration projects with integrated technical and biological measures; maintenance of dikes and protection works along the river (penels, gabions). maintenance and cleaning of drainage system; afforestation of deforested and bared land on riverbanks and coastal area with suitable species; stop spontaneous gravel and sand mining; establishment of forest protection belts on both sides of the river 100-200 m wide in order to protect that from damages; ensure participation of local comunity, local government and interested parties (Muharremaj, 2001).

Conclusions and recommendations

Conclusions: The Semani watershed has a high diversity of flora and fauna species and habitats, important forest formations (Mediterranean pines, oak, beech and fir, makia, riparian vegetation). It is the home of some endemic, sub-endemic or Balkanic plant species, of local and international importance, part of them under risk. Of great value are the National Parks of Tomorri (with bear, wolf, fox, etc.) and Fir of Drenove; the Osumi Canyon, preferred for rafting and Nature Monuments (geo, hidro- and biomonuments).
Problems related to Semani watershed deal with deforestation, soil erosion and sedimentation, flooding and loss of biodiversity. Recent threats include the construction of some hydropower stations and gas Trans Adriatic Pipeline – TAP, which affect also some of protected areas. Intensive agriculture, overgrazing, uncontrolled industry, unplanned urbanization, gravel mining on riverbeds have also affected the preservation of biodiversity and sustainable natural resources management.

Recommendations: Preparation of the integrated management plan for the Semani watershed would include the erosion control and sedimentation through technical and biological measures, especially the protection of forests and increase the protected areas, riparian vegetation and the littoral forest belt. Mining of sand and gravel from riverbeds should be prohibited; it can be planned in places where the sedimentation overpasses the extraction and based on studies and restricted to low-flow periods. The construction of dams should be avoided on areas with valuable biodiversity. The damaged works and structures on rivers need to be repaired and the new ones should be planned and constructed when necessary.

It is recommended to set up the system of the ecosystem services and climate change adaptation measures; the application of conservation tillage measures in agriculture; the wise use of water resources and reduction of their pollution, monitoring the river sediments and water quality.
People awareness on natural resources and biodiversity protection with increased investments would help foster tourism as a means to promote development and prosperity in these areas.

Fig6 / Constuction for Semani riverbank protection source / the author

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Erosion and industrial pollution of Seman River

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Introduction

Albania has a rich hydrographic system. The rivers Drin, Bune, Mat, Ishëm, Erzen, Shkumbin, Vjosa, and their branches constitute the hydrographic network of large rivers flowing from average height of 703m above the sea level towards the Adriatic Sea. Seman River is one of the biggest of the country, with a length of 281km and a watershed area of 5649km2, formed by the conjuction of the river Devoll and Osum River.

The river basine and its watershed are characterized by high rates of soil erosion and river banks sediments, estimated at an average of 1.2 million tons/ year, due to the peculiarities of the watershed basin in the mountain, more than 2/3 of the total length of the river, and to the lowland area at the junction point between Osumi River and Devoll (at Kozare area), to its river delta and to its morphological characteristics and soil texture with high content of sand and silt. The river and surrounding lands are exposed to pollution from activities conducted by the industry of extraction and processing of oil in Kuçova, Berat, Patos-Marinez and from oil discharges at river Gjanica, coming from the oil processing in Ballsh factory and from the wells and oil extraction along this segment.

This article aims to address precisely two issues: a) the high level of erosion and b) industrial pollution from oil, which are sensitive phenomena, compared with other rivers, as well as to analyze the causes and impacts that impact environmental, social and economic development in the urbanized area along the river basine. Seman River has undergone significant morphological changes on his river delta along a coastline of 32 km, causing coastal erosion and frequent changes to the river delta. Based on the existing situation and environmental analysis, protective measures will be proposed on these territories in order to respond to the rehabilitation of the degraded and polluted areas and improve responsibilities of research institutions.

Main theories

This study is based on the assessment of This study is based on the assessment of the level of erosion and pollution of Seman River, as these indicators in this case are more relevant compared to other rivers in Albania, by analyzing the morphology and geology of river, human interventions, causes and effects of erosion and environmental pollution.

For this purpose field surveys and terreain measurements were undertaken. There were also done a series of analysis regarding chemical groundwater, river morphological changes, the exploitation of river basin, and the assessment of potential flood hazards on residential areas, by evaluating the level of implementation of protection and rehabilitation measures.

According to the theory of river basin management, in order to reduce the erosion and pollution of the river, the priority is given to the study of gravel reserves and their exploitation based on predetermined criteria, the gradual replacement of river gravel with materials from other sources, the increase of vegetation cover in the basin, the reduction of polluting substances, particularly hydrocarbons

that are discharged into the river and in the drainage basin from the wells in the oil fields to the Gjanica River.

Methodology of study

The methodology of the study focuses on the assessment of the level of erosion and pollution of the Seman River including the surrounding areas, cosidering the continuity with Devoll and Osum branches, which flow into the larger body of Seman River in its last 90 km to the sea.

The existing context analysis are based on the following field measurements and surveys: soil loss calculation related to the erosion, the monitoring of water quality, physical and chemical indicators of the soil, causes and sources of river chemical contamination from oil resource management, problems related to practices of bad exploitation of gravel, as well as alternatives of protection against erosion and pollution.

Geomorphological characteristics of the Seman Basin

The Seman River is formed by the conjunction of Devoll and Osum branches. It has a length of 281 km and is situated at 863m above the sea level. The slope of the river bed is 3.6% and is considered mainly as a mountainous river till the point of conjuction with two branches.

The geomorphology of the Seman river bed is simpler compared to other rivers in Albania. As for the morphological configuration, the river bed is divided into two parts: from the conjunction of Devoll with Osumi River in Kozare (west of Kucova) to the village of Seman, the river has meandering features. From the conjuction point of Devoll with Osum until the rivermouth, all over its length the river has a plain character. On both sides of the river bed is formed an alluvial field, made of sandy, clay and silt. In the second segment, the geomorphology of delta and other environments is composed of sedimentation with sand deposits and sand dunes, lagoon deposits, beach and maritime deposits. As a result of sand dunes along the shore, the river has often changed its bed. The organic sediments of the lagoon, along the river bed, continue to develop marsh processes.

Devolli and Osumi at the junction point with the Seman River in Kozare, directly affect its morphological features, at the level of erosion and pollution of the Seman River. In the upper stream of the Devoll River, the torrents that constitute it, carry loamy materials such as clay, sand, conglomerates and coal-containing particles.

From the gorge of Zemblak to Maliq, the river bed passes through the marsh deposits, further meets the ultrabasic formations, and in the Gramsh valley passes over unsteady flysch structures with a powerful erosive activity.

In the Devolli mountain chains, the valley takes on the shape of a canyon, with very steep slopes, further distinguishing the erosive-accumulative terraces. In the lower stream of Devoll, from the mouth of Tomorricë to Kozarë, in 35 km of length, considering the genesis and geomorphology, we can distinguish tectonic-erosion valleys, developed river basins on several levels, of an erosive-accumulative character.

The Osumi watercourse starts from the Kolonja Mountains to the Gorge of Mican, forming a 24 km long valley with erosive-accumulating terraces. Up to Çorovoda, the river bed is placed on karst, flysch and ultra-basics deposits. The deep erosion of the valley is currently very intense due to the influence of tectonic movement of the region, the steep slope and the low vegetation coverage. From Çorovoda till the junction point with Devolli branch, the river flows through flysch, alluviums and limestone formations.

In the slopes of valley the erosion is very intense. From Poliçani, there are up to 5 levels of terraces, which indicate that the river is in the phase of full maturity. In the lower course of Osumi river: from Berat, at the junction point with Devoll branch, the river forms many meanders and increasing gravel amounts. In this part the river bed is around 200-300m wide, and is placed on the old river bed, which has formed the surrounding plain. Osumi transports to Seman about 995 million m3 of water per year, an average flow of 32.5 m3/ sec and an annual rate of solid flow of 1.35 million m3.

Geological construction of the Semani basin

The geological construction of the basin is characterized by various layers on the slopes and the type of rocks in which it is composed (Devoll and Osum). In certain segments of the Devoll and Osum River, weak rocks such as clay, flysch, especially in the conditions of very steep terrain, are eroded faster than other materials. The steep terrain, the height of Devoll and Osum River and its geological composition reduce slope stability, provoking the erosion and collapse of rocks.

The Semani River is fed with alluvial materials from Devolli and Osumi branches; its river bed is covered with fine sand along most of its length, which

contains quartz, sand, lime and gypsum particles. The River valleys and the hilly slopes are made by the deposit of alluvial materials deposited at different times and consequently the sustainability of the river banks along the segment changes considerably. The deep river valleys show deep erosion and the steep slopes of the river stimulate erosion, slides and the collapse of the rocks.

The amount of annual rainfall on the Seman river basin ranges from 1,000 to 2,000mm with an intensity of 80% on the period from November to March, an average annual flow rate of 101m3 / sec, a maximum flow 1,800m3 / sec and a maximal flow to 3000m3 /sec (monitoring of 1962). In the case of the Devoll and Osum rivers, the flow of surface water and hydro-meteorological factors such as precipitation, snow, temperature change, plant cover change, and economic activity, urge the intensification of erosion forms of the basin and river banks. A high level of flows erodes the slopes of the valleys and the eroded materials are deposited in the river. The rocky slopes spoil their balance and break down tumbling, sliding and collapsing.

Erosions on the Seman Basin

The Seman river is one of the most erosive rivers of the country. The analysis has shown that from the point of junction of Devoll with Osum to Mbrostar, the water turbulence varies from 3,500 to 5,500gr/ m3. The evaluation of river erosion and the Seman basin helps to plan the measures of land protection and reduce the soil loss from the erosion, floods and river defense engineering facilities. The annual quantity of suspended materials carried in the Seman River and the rivers that form it, is about 7.5 million tons/ year, which indicates the high level of river erosion in the whole watershed. The Semani River is the most turbid river in the country. The suspended solid substances is equal to a surface of 730 ha with a thickness of 1m.

During the last 25 years, several forms and causes of intensification of Seman erosion have been identified, such as coastal erosion and delta changes, unsuitable exploitation of river gravel, slope deforestation and lack of vegetation on the river banks. As a consequence, the river dikes which protect the surrounding lands and settlements from the flood have been damaged in 15km or 25% of their total length. 50% of the penels that protect river banks from the erosion have lost their function. The loss of soil from erosion varies from 3-9 ha per year. In the extreme years, about 30 thousand ha of agricultural land are flooded by the Seman River. The long time exploitation (1991-2012) and the lack of any criteria for the exploitation of the river gravel in the segment from Ura-Vajgurore up to Mbrostar, have caused deep erosion of river banks along the whole segment.

By monitoring the erosion of the banks of the Seman River in a segment of 5 km on both sides of the Mbrostar Bridge, the loss of soil in the depth of the profile is estimated at 241,000 ton / year (Lushaj Sh, Laze P, Kovaci V etc.). Among the main causes of erosion are:

i) The exploitation of the river gravel without any criteria. The soil texture on Seman riverbanks is dominated by sand and lime particles and is associated with the shattering of the river banks. From the study of lands around the Seman River (Lushaj Sh, Zdruli P, Cara K) it results that the soil structure varies according to the areas. On the Osumi banks dominates the soil with sand content of 41.12- 41.72%, silt 31.44-35.64% and clay 23.24-26.84%. In general, in the whole segment of Seman River from the joint point till the rivermouth, dominates the soils with a high content of the sand and silt, and wth high erosion predisposition.

ii) The watershed surface of Devoll and Osum lie in the mountainous and hilly area, while the lowland part begins at the point of juction of Devoll with Osum, up to the river mouth. In this segment, the rain intensity increases with 80%during the period between November and March. The maximum river discharges are recorded in the years 1962-1963 with 3,000m3 / sec. Solid discharge of the Seman River during the winter and spring seasons represent 70% of the annual amount, in spring 20% and 10% in summer. During November and December, flows about 30% of the total solid mass discharge.

iii) The high steep of slopes of Devoll and Osum River stimulate the soil erosion and sediment transportation due to the low vegetation cover of slopes.

iv) Only 30% of the surface of the Seman basin is covered by vegetation, so the intensity of erosion is increased. Under these conditions the soil surface is easily eroded at the highest limits of up to 180 ton/ ha. Therefore, the afforestation of the river banks and that of the watershed in general is one of the most important objectives.

v) Until 2003, rivers have been exploited without any criteria for gravel mining, causing hydrotechnical changes to the river bed, erosion of the river banks and changes in the coastline. The National Water Council Decision No. 1, of

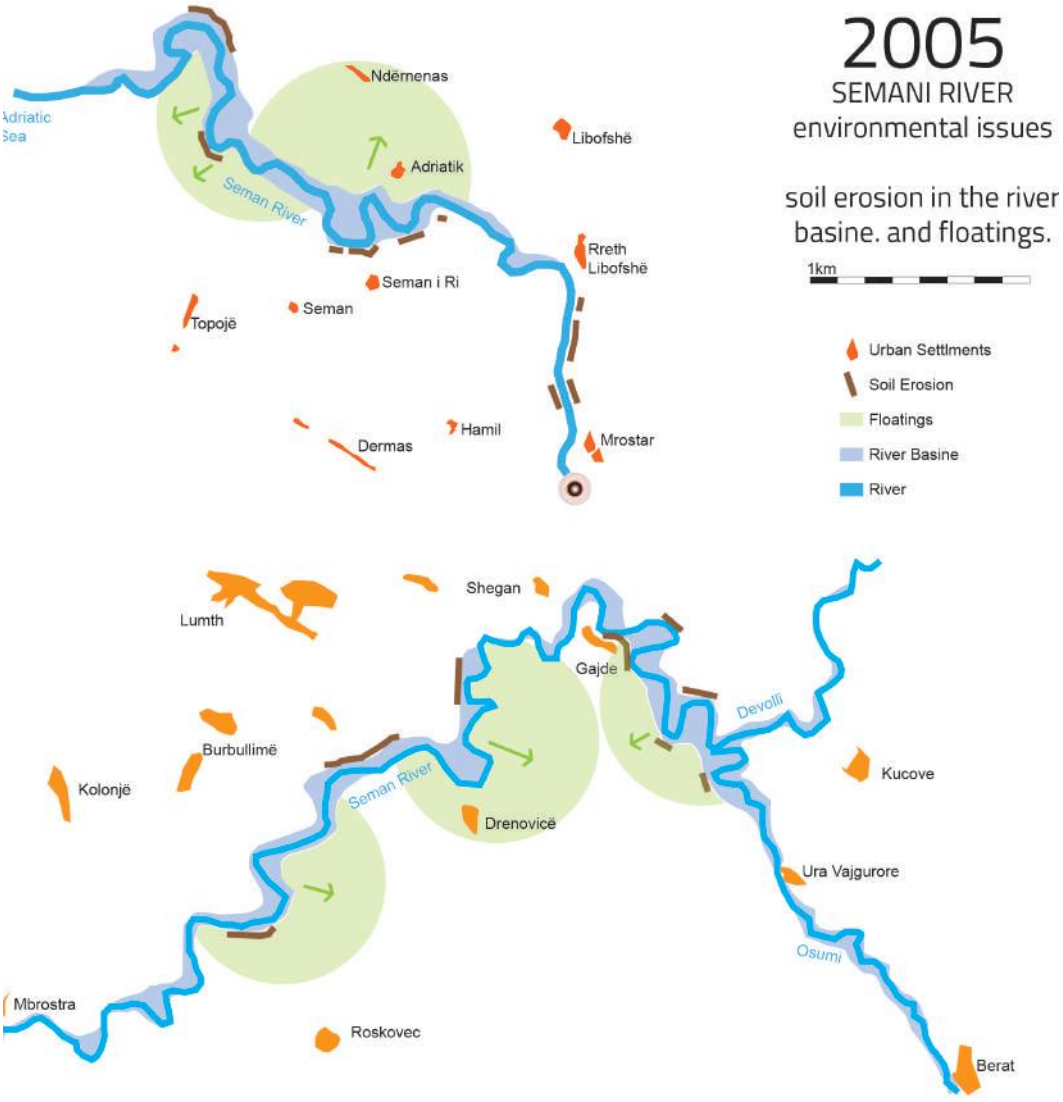

Fig1 / Erosion of Semani River in 2005
source / drawing by Artan Kacani

09.01.2003 introduced some regulations on the way and time of use of gravel mining. This decision prohibited the gravel mining in several segments of the Seman River such as: in front of Marinza, on both sides of Kuci Bridge, etc. On the Osum River, 500m from Ura Vjagurore any kind of uses were prohibited. In 2006, the new decision envisaged the gravel mining only in the period between 1st of June to 31st of October of each year. This decision aimed to limit the harmful practices of gravel mining with consequences on the degradation of the river system, soil loss and erosion of river banks and the increase of flooding areas. However, this decision has not been properly implemented and informal gravel mining has continued during that period.

vi) Only 21% of the surface of the watershed consists of permeable formations, 51% semi-permeable and 28% impermeable. The permeable formations in some segments allow splitting of riverbanks and flooding.

vii) The demage of the engineering protection works (protective penels, dikes in the range of 25-60% in the period 1991-2003) due to high inflows, the damages of the dikes and protection structures of the Seman River, the agricultural lands have been flooded in 14 places situated from the Devoll and Osum junction, to the rivermouth.

viii) Along the river segment there is found massive erosion of agricultural land, especially in the periphery of the junction point between Devoll and Osum River. There are deviations of the riverbad, and mass erosion of agricultural land like in Grecalli, Mbrostar, Ndërnenas, Grykë, Jagodinë, Sukë. Close to the river delta (in the Seman village) in a segment with a length of 6km there is a continuous river bank erosion. The erosion level on the river banks in the segment Murriz-Toshkez varies from 25 to 40 ton/ ha. In the segment from Kuçi bridge up to Mbrostar, the main cause of erosion is the damage of the protective works and the

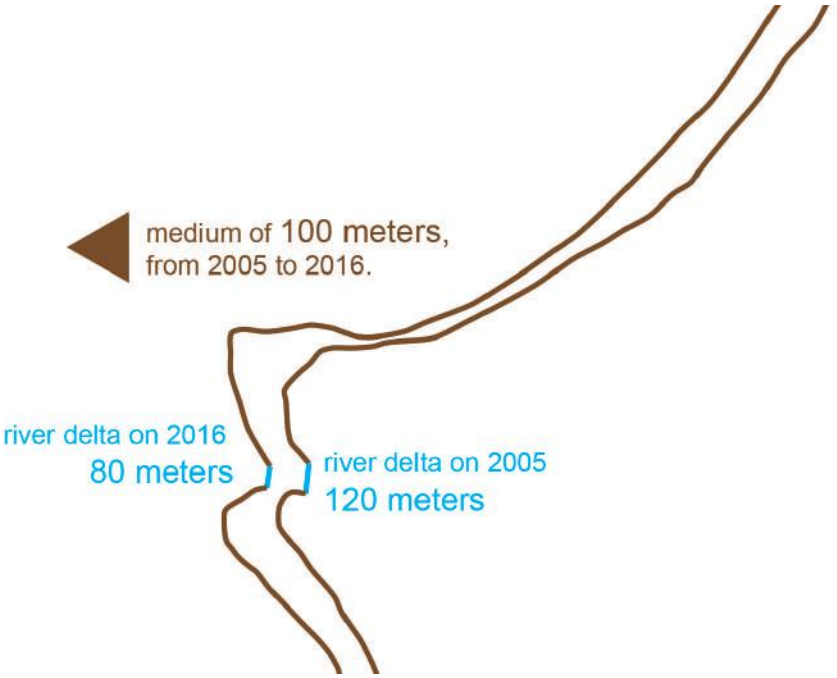

Fig2 / Change of the river mouth
source / drawing by Artan Kacani

gravel mining.

Change of river mouth

The Seman River from 1870-1990 has The Seman River from 1870-1990 has changed its delta 6 times, in average every 18-22 years. In the same period the coast has been eroded along 3-7km. The turbidity changed in 1918, 1924-1925, 1937, 1957, 1978. With the construction of the Karavasta hydropower plant, erosion intensity on the coastline increased from 15 to 35m per year. Seman's beach was build during the years 1958-1962 in an area with distinctive erosion phenomena. Some years after the construction it was further destroyed by coastal erosion and the advancement of the sea to the land. In 1957, the river delta moved 4.6 km to the south. In 1978, the river was divided into two parts 6km south of the 1957 site, located 2 km away from each other, advancing inland. While in 1990, the river mouth compared to 1978, has advanced toward the south. These moves have coused changes in the coastal line as well as have simulate coastal erosion, with sea advancment towards the land in some segments, and land advancement towards the see in other segments.

The After the 1990s there has been a large amount of loss soit due to the intensive use of gravel mining materials and the minimal amount of material transportantion in the river delta, while in the last 5 years, due to interruption of gravel mining explotations, an advancement of the land towards the sea is observed.

Coastal erosions

The implementation of measures for the protection of the coasts from erosion such as the offshore reforestation, engineering measures, strengthening of embankments, abolition of gravel mining utilization will stabilize changes of the coastline in particular changes of the rivermouth.

The pollution of the Seman River and surrounding lands

The Seman River is one of the most polluted rivers in the country. Specific causes of pollution are (i) hydrocarbon discharged by the oil extraction industry in the Patos-Marines area, where about 2,400 wells are used, (ii) leaks from the Ballsh oil processing plant, transported through the Gjanica River and shed in the Seman river (Iii) accidental oil spills during transport and collection of the product, (iv) urban solid wastes, industrial wastes, direct discharged wastewater and unsettled septic tanks that are discharged untreated into the Osum, Devoll and Seman rivers. The water of Osum, Seman and Devoll Riverwas used for irrigation in agriculture, which caused chemical, toxic, hydrocarbon deposits and environmental and human health hazards. Another source was the battery production plant (built around the 1970s in Berat Uznove) which discharged a toxic metal that causes soil contamination around the plant area, Osumi river pollution and caused life and health hazards for the population of the area.

From the monitoring of 6 water samples in the Osum and Devoll River (Bihuri M, Lushaj Sh, 2015) (analyzed by DFS) results that the Zagori brook discharge to the Osum River waste water lead (Pb) from

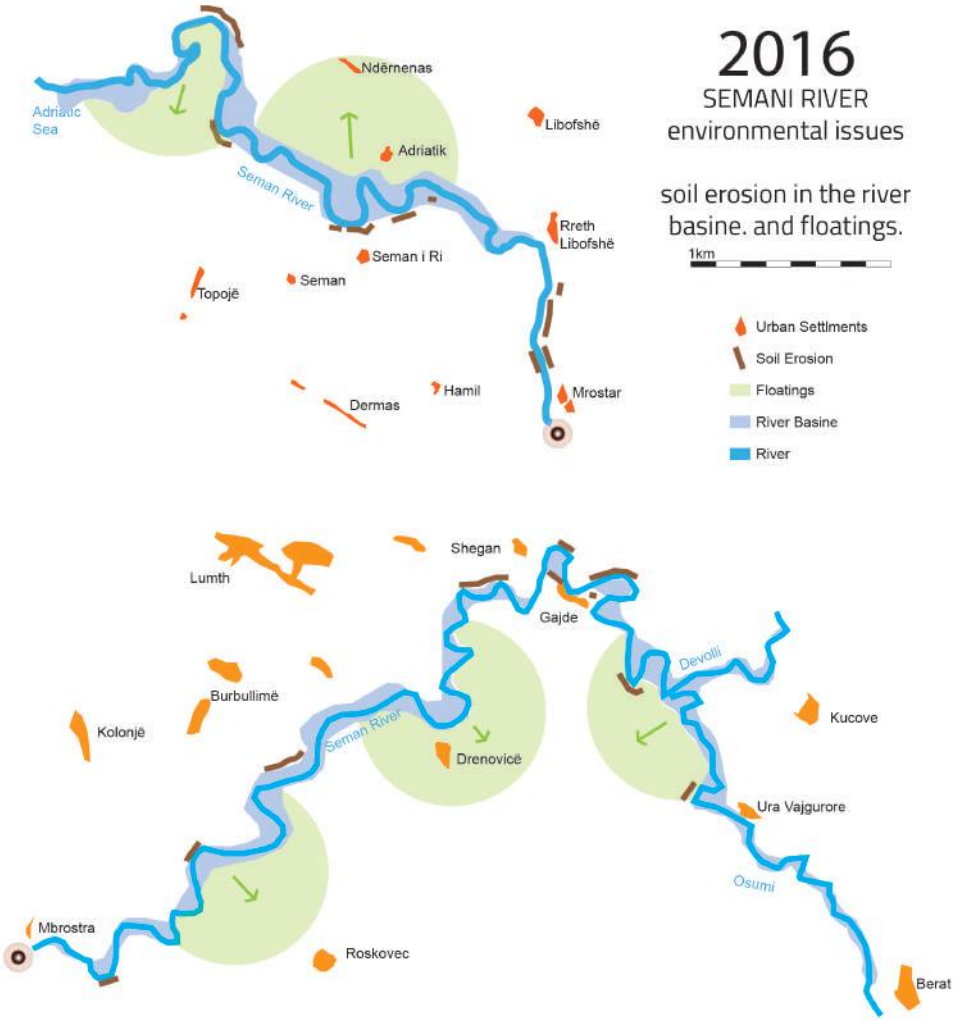

Fig3 / Erosion of Semani River in 2016
source / drawing by Artan Kacani

the former production plant of batteries, which has been operating until 2008, as well as the untreated industrial waste of various industries in Berat. In the oil field and the battery production plant, in the Uznova and Ura-Vajgurore area, the number of people affected by chronic diseases (allergies, allergies, epilepsy to children, behavioral changes, blood diseases, leukemia, etc.) was higher compared to other areas. The oil wells distributed around the residential areas in Kuçovë and the oil deposits close to the Osumi River, in the Patos-Marinez oil depot area (map 2) polluted the agricultural lands, which have lost their functions as well as underground and surface water, degradation of the ecosystem soil and aquatic flora. Devolli and Osumi water flux ranges from 8-8.2, electrical conductivity (ECW) 375-425 μs / cm, solid suspended matter 179-650 gr / l, NKO 7.6-9.75 mg / l, NBO 4-6 Mg / l (DSHP, 2014), addition of suspending agents, ammonia, sulfates, phosphates, nitrates, Cr, and dissolved oxygen digestion. This situation indicates that the water of the rivers is polluted and with high content of loamy materials.

From the oil processing plant in Ballsh and Patos-Marinza, the residues of hydrocarbons with high content of toxic substances are discharged to the Gjanica River and then flowed to the Seman River, with direct impacts on river fauna and the quality of groundwater. According to the calculations (based on the level of inflows and concentration of water contaminants) it results that the Gjanica River transports more than 10 thousand m3 of liquid waste (hydrocarbons and industrial), causing deterioration of the biodiversity and water quality, and soil damage. Monitoring on agricultural lands in the Kuçovë-Patos-Marinza oil field and around Ballsh oil processing plant, in the depth of 0-30cm, shows that the content of Ni, Pb, Cr, Vn (vanadium) and hydrocarbons as contaminant Oil extraction activity have a high concentration.

This data shows that the content of Ni, Vn and hydrocarbons in the soil is high, compared to the allowed levels of Ni, Pb, Cr, hydrocarbons. In other sampling places, land analysis shows a high content of heavy metals. In the Marinza lands close to the oil wells, Nickel content is (Ni)

630 ppm and lead pb) 359 ppm. While in Ura Vajgurore, close to the oil well area, the Ni content ranges from 360-410 ppm and lead (pb) 347-365 ppm. The outbreak of hydrocarbons has contributed to the general damage of the living world or the removal to other aquatic environments. Seman River water was used for irrigation of agricultural lands and the amount of hydrocarbons in the soil has increased. The three-point systematic analysis (Vajgurore Bridge, Kuc's Bridge and Mbrostar Bridge) shows the Seman River pollution from the over allowed limits of hydrocarbons, to the damage of water biodiversity.

Possible rehabilitation measures

The watershed, the banks and especially the lands in the lowland area of Seman River across the entire length of the segment from Kozara to Mbrostar and close to the river mouth are subject to a powerful erosive action. In order to limit erosion and landslides on the banks of the river, it is necessary to plan and implement some measures such as:

- To implement a basin management and restoration program, addressing clear responsibilities: actors, projects, staff, expectations, engineering protection measures, damage restoration, reconstruction, protective infrastructure and land use planning, defense and management at of watershed;
- River management and rehabilitation is a fast growing topic for environment, geology and ecology scientists (Gary J, kirstiea A. Fryirs).
- To determine, referring to the environmental permit for the use of river gravel mining by the subjects, the area of exploitation on the basis of reserves, the application of exploitation criteria, so that exploitation does not deteriorate the river's dynamic and hydrologic parameters. The exploitation is based on the geological, morphological, hydrological, land protection, hydro technical works of engineering facilities and the environment. The volume of use of gravel mining must be calculated by preserving the balance between the used quantities with the quantity transported to the river mouth, with the aim of reducing coastal erosion.

On the last 25 years, due to the break of these balances, coastal erosion has been intensified in different directions. Currently the level of the gravel mining used in the Seman River should be reduced to increase the flow rates of accumulation, in order to reduce the impact on the morphology of the canal and coastal erosion.

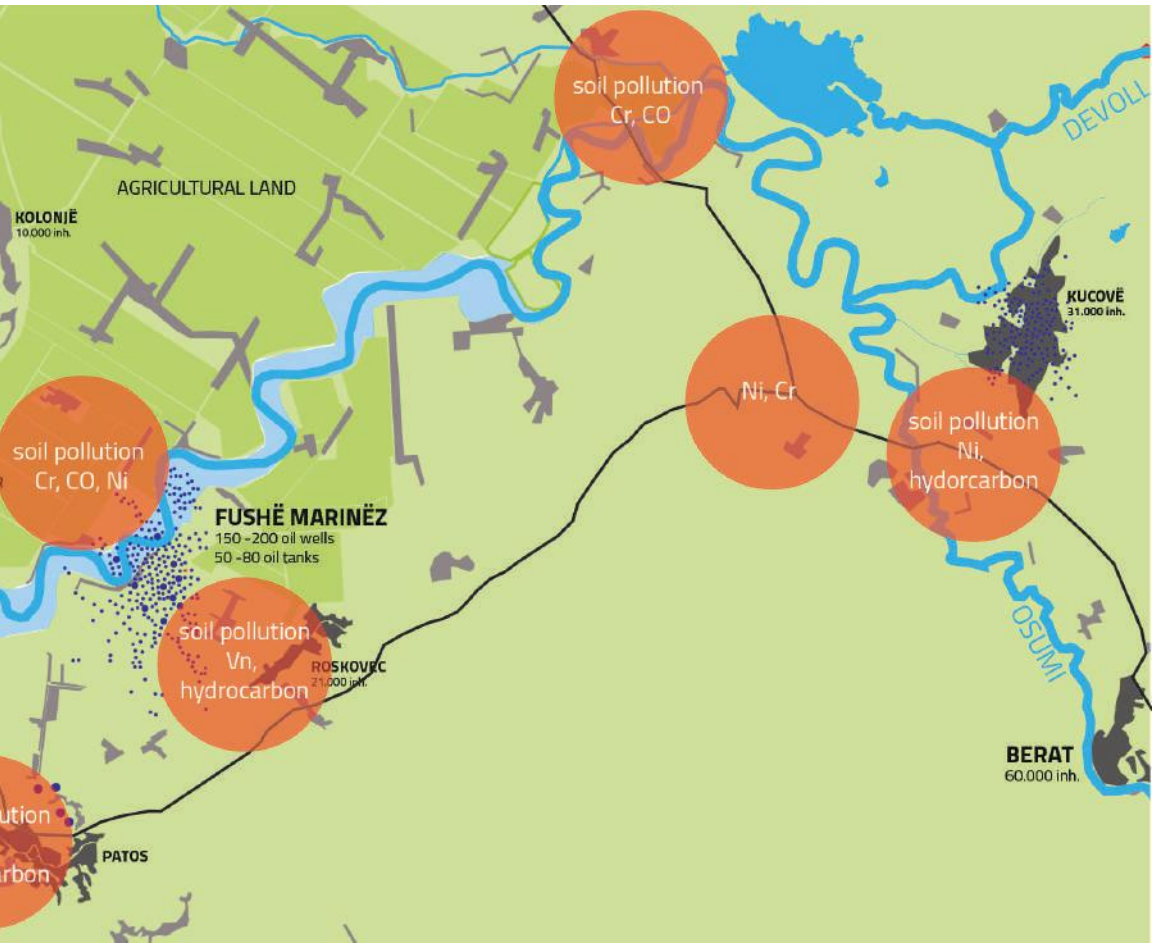

Fig4 / Soil pollution map
source / drawing by Artan Kacani

No.	Sampling place	Ph	Ni ppm	Pb ppm	Vanadium(Vn) ppm	Hydrocarbure mg/100 gr toke	Cr ppm
1	Marinez-Patos	7.2	250	114	92.1	246.7	
	Marinez-Patos	8.7	216	114	48.6	129.4	
	Marinez-Patos	8.5	284	126	109	454	
	Marinez-Patos	8.1	216	137	83	117	
2	Kucove	8.7	361	80	101.3		
3	Uzina perpunimit naftes Ballsh		550	370			419
4	Uzina perpunimit naftes Ballsh		581	390			466

Table 1 / Content of heavy metals and hydrocarbons in the land close to the oil field
source / the author

- The method of using the river gravel mining must take into account the erosive effects according to the particulars segments that can change the geomorphology of the canal as soon as the exploitation starts (Kondolf, 1993,5. 1994). Materials should be used only during low flow periods, abandoning the practice of exploitation in the high flow period, prohibiting exploitation under the water level, eliminating the exploitation of river banks. Exploitation should be based on the study of gravel mining reserves by reducing the environmental impacts (prevention, restoration of damages).
- It is necessary to improve the criteria for using gravel mining materials based on projects, estimated reserves, prohibition of exploitation in some problematic and potentially erosive, the rehabilitation of the area after the exploitation, the monitoriation of the existing situation and landscape protection measures. The exploitation project is accompanied by

all the documentation ensuring project utilization and process monitoring (maps, geological conditions, hydro-technical, hydrological data (seasonal flows, condition, potential reserves, area, surface area, manner of exploitation, protection and rehabilitation of protective works, protection of land from erosion, and shore rivers. To apply hydrological criteria, which means that no project is drafted or licensed in case there is no hydrotechnical study (of the river and river channel regime, river protection works, conditions of the banks and the river configuration). River conservation and management cited by (Philip J & Paul J Raven), essentially includes the improvement of legislation, policies, institutional responsibilities,

- Good practices and public participation.
- Construction of defensive structures (panels, 20 km of dike, river basin forestation in 30-50% of the river segment, repair of damaged panels, construction of 8 protective panels on the shores of the river from the Mbrostari Bridge to the river mouth and reforestation and improvement of forest coverings along the banks River about 9-12ha from the Mbrostari Bridge at the river mouth.
- The pollution of the river and surrounding land is a problem, which asks for a solution, by improving the technology of exploitation of wells, the elimination of accidental spills and transfer of deposits from agricultural land, uncontrolled explosions, the change in the structure of agricultural production in the contaminated areas to avoid risks for food safety and rehabilitation of contaminated land.
- The prohibition to spill hydrocarbon in Seman from the Gjanica River requires a special study.
- The establish and put to work the water monitoring network for the suspended material, the floods, soil and water pollution of Semani and Gjanica, in all periods of the year.
- To stop using rivers gravel mining, replacing them with quarrying gravel mining materials. . After monitoring the reserves, to use only those segments in which the senders that cause flooding are collected, in order to avoid the impact on the morphology of the river channel, the change of the costal line and the alteration of the river mouth.

Conclusions and recommendations

The Seman river compared to other rivers in the country, has the highest level of erosion, not only from the point of junction of Devoll with Osum, but also on the Devoll and Osum branches. The amount of loamy material in the river flow varies from about 7.5 million tonnes per year, which indicates the high erosion rate, the erosion of the shores, and the high damage of the engineering structures. In extreme years the flow rate reaches 3,000 m3 / ha. The shores of the Seman River are subject to a strong erosive action throughout its length, and on the shores and agricultural lands, especially in the flat area across the entire length of the Seman River (Kozare-Mbrostar-grykederdhje). The geological construction, the high slopes along the Devoll and Osum flow, the sland structure with high sand content of the soil, the lack of vegetation cover on the banks of the river and the watershed, and the limited use of gravel mininges for 25 years of construction, costitute the main cause of disruption of the hydrotechnical balance of the river, the frequent alteration of the estuary, and the massive erosion along the river banks to the surface and in depth. The Seman River is polluted also by agricultural activities such as fertilizers, pesticides, urban waste etc, but the main pollution,which needs attention is related to hydrocarbons, as the Kuçovë-Patos-Marinza plain area is an oil field that is exploited through wells, where about 30,000ha of land is polluted. In addition, the Gjanica River collects the flow of the Ballsh oil processing plant, as well as the wells flow, pouring them into the Seman River. The dumping of hydrocarbons on land and river has increased the content of heavy metals and hydrocarbons, damaging heavy water biodiversity, water quality, soil pollution by the use of irrigation water and the quality of life of the inhabitants.

Recomandations

I) The management plan of the seashell watershed needs to be developed, in order to: identify problems and opportunities; start the planning and implementation of the technical, engineering, defense and rehabilitation measures of the river basin, foreseeing the rehabilitation of defensive structures (embankments, river basins); plan the afforestation of uncovered riverbank sections (new afforestation and vegetation densification), the river channel and river banks, in order to reduce the risk of erosion, anti-erosion measures; decide on a criterion-based and limited use of river gravel mining, based on the study of reserves.

(II) Foreign and domestic oil and gas companies in the Patos-Marinza and Kuçova areas must submit a plan for the rehabilitation of damages caused to the oil field for soil, water, environment and soil pollution, and health of the population as part of the environmental use permit.

Fig / Sedimentation in the Semani River Delta source / Vezir Muharremaj

(III) The responsible state institutions, in cooperation with the exploiting companies, should carry out studies on the treatment of the contaminated water of Gjanica River, which discharges hydrocarbons in Seman river, starting from the source that is created in the oil processing plant in Ballshit factory and in continuity.
(IV) Integration of territorial planning, defense and management at the watershed level, so that the economy, the environment and the protection of the territory can act all in one.

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Evolving waterscapes by relying on instability / An operative approach to river systems' design and planning towards new “repairing” and “performative” landscapes

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Introduction

The layout of river systems, as we observe them nowadays, is only a phase of an unstable process where modifications happen according to different spatial and time scales due to climate and geological changes, human landscape alterations and the respective ecological adaptations.
Representation methods have long struggled with seizing such features since morphodynamic imagery has radically changed our awareness of rivers' evolution as the result of overlapping forces acting at several levels.
Even though trade-offs between the impacts on ecosystems, sustainable allocation of water resources, and economic interests are often at the centre of regional management policies, the recurring operative approach to the topic seems to ground on a paradox. In fact, it deals with the misleading expectations to freeze or restore the “natural” functioning of the river ecosystems, while indeed they are inherently on-the-move. It seems that forces operating in this sense should be someway balanced by the idea of an “authentic landscape” which is as reassuring as unhistorical. The concrete result of such a mindset is an increasing disjunction between technical developments and landscape outlooks: the first looking ahead, the second backwards.
Unless we want to perpetuate such approach, we should attempt to conceive the landscape as a stratification of always new arrangements, layouts and usages.
In this perspective, our research contribution focuses on the “waterscape” topic working through an integrated design approach based on the early combination of diverse expertises. This has produced a vast range of proposals aimed at matching infrastructural works with new landscaping procedures.
In both the applicative key studies presented in this article, environmental risk management (pollution and flood control) and tourism development act as strategic drivers, motivating landscape transformations.
Such method may find further and interesting applications in those territories, such as the Balkan Peninsula, which are now experiencing huge hydromorphological developments, due to the increasing demand of water or energy supply as well as the necessity of floods control. The speed at which this is happening threatens to reiterate a mere technical-oriented approach leaving out more systemic opportunities.
In this framework, blurring the boundaries between disciplines is a paramount concern to shift the viewpoint having a more holistic approach to the subject.
Furthermore, even though a spatial planning approach needs to be implemented in order to evaluate environmental cost-benefits of infrastructural works, the forthcoming landscape will be also the result of a cultural attitude towards the concepts of instability and change which mark the inner essence of river systems.

Inspiring morphodynamics

An intricate combination of factors has contributed to shaping river systems, as we observe them nowadays. Also, their current layout is only a phase of an

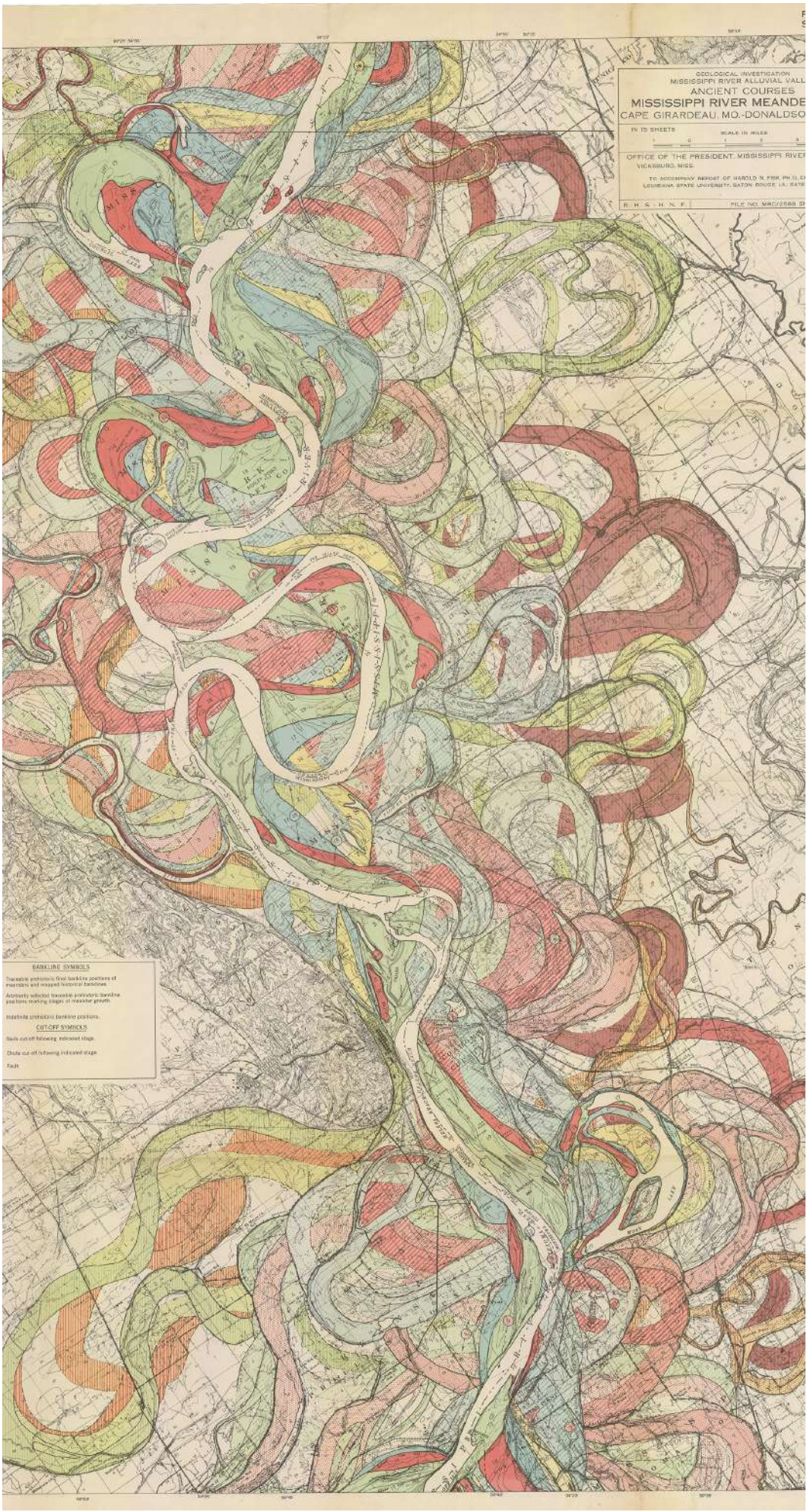


Fig1 / Geological Investigation of the Alluvial Valley of the Lower Mississippi River-Plate 22, Sheet no. 6
source / US Army Corps of Engineers

unstable process where modifications happen according to different spatial and time scales due to climate and geological changes, human landscape alterations, and the respective ecological adaptations.
Representation methods - used by cartographers, geographers or landscape and urban planners - have long struggled with seizing such features whose study is fundamental to manage predictive development scenarios and risk assessment analysis.
The Second World War marked a turning point in this regard since in 1941 the US Army Corps of Engineers' Mississippi River Commission commissioned the geological survey of the Lower Mississippi Valley to the geologist Harold N. Fisk. His full technical report (Fisk, 1944) contains 33 map plates most of which succinctly present the complicated historical courses of the river, colour coded for different ages of point bar migration, chute cutoffs, and avulsions (fig.1). This massive work, completed in just over three years, is a cartography milestone and probably the first example of fluvial morphodynamic representation.

Just in the last few decades, the improvement of remote sensing surveying techniques - such as aerial photography, airborne or satellite digital imagery and LiDAR[1] - has allowed a more accurate knowledge of rivers' dynamics increasing the awareness of their past and future impact on landscape morphology.
The LiDAR-derived digital elevation model of the Willamette River (fig.2), for example, visually replaces the relatively flat landscape of the valley floor with vivid historical channels, showing the dynamic movements the river has made in recent millennia. It displays a 50-foot elevation range (i.e. 15,24 m), from low (displayed in white) fading to higher elevations (displayed in dark blue), providing a deeper landscape characterisation that shifts our attention from the river itself into the topographic system it has been able to generate.

Such representations reveal how river basins are the result of overlapping forces acting at different levels. At the geological time-scale, huge modifications cover very long periods and allow ecosystems to adapt progressively consolidating the relationships between their biological and morphological components. On the other hand, human alterations operate in a shorter time perspective, generally according to functional needs and economic interests which feed a competing demand for limited river-based services, central to the growth of a territory's economy and quality of life.
Water supply for industry, agriculture and mining, quarries, hydropower plants and navigation infrastructures or recreation facilities, just to name a few, are all factors that over time have affected rivers' hydromorphology as well as the necessity to keep a strict control on it. Furthermore, the vast range of productive areas and settlements accumulated around rivers requires a constant updating of defence, as well as maintenance works which perpetually reshape embankments, riverbeds and vegetation.
Even though trade-offs between the impacts on ecosystems, sustainable allocation of water resources, and economic interests are often at the centre of regional management policies and river science's researches (National Research Council, 2007), the recurring operative approach to the topic seems to ground on a paradox.

In fact, it deals with the misleading expectations to freeze, maintain or restore the "natural" functioning of the river ecosystems, while indeed they are inherently on-the-move, due to anthropic interventions and environmental transformations. It seems that all the forces operating in this sense should be someway balanced by the picturesque idea of an "authentic landscape" which is as reassuring as unhistorical.
This attitude is likely to reduce the landscape project to a kind of vintage maquillage aimed at concealing the territories' structural evolution behind a fake postcard image. The concrete result of such a mindset is an increasing disjunction between technical developments and landscape outlooks: the first looking ahead, the second backwards.

Starting from these considerations, during the last few years, the Sealine Research Centre (University of Ferrara) has faced the problem working on the "waterscape" topic through an integrated design approach, based on the early combination of diverse expertises such as landscape planners and designers, energy and hydraulic engineers, geologists, ecologists

1 / LIDAR (acronym for Light Detection and Ranging or Laser Imaging Detection and Ranging) is a remote sensing technique that allows to determine the distance of an object or of a surface using a laser pulse, in addition to determining the concentration of chemical species in the atmosphere and in the water.

Fig2 / LiDAR imagery by Daniel E. Coe. of the Willamette River source / Oregon Department of Geology and Mineral Industries

Fig3 / The Piscinas (left) and Naracauli rivers passing through the dunes before reaching the sea source / Sara Cuccu's Master Thesis

and geographers. This has produced a vast range of studies and proposals aimed at matching infrastructural works with new landscaping procedures (Emanueli and Lobosco, 2015).

Our main objective is to investigate the way landscape devices may contribute to drive rivers' system transformation towards new modes of exploitation, fruition and relationship with the context.
In the following paragraphs, we present two applicative key studies in the Sardinia region (Italy) developed by two master thesis within the Laboratory of Landscape Architecture at the University of Ferrara, Architecture Department.

The first project[2] elaborates, within the context of a Geological and Mining Park, a step by step strategy aimed at combining polluted rivers' remediation works with new fruition and usage opportunities tied to recreational and cultural tourism, as well as to new production chains based on renewable energies.

The second project[3] deals with a set of problems affecting the Coghinas River's catchment area for which it proposes, along with an alternative approach to floods control, a strategy to involve the fluvial system within the territorial touristic offer, until now only focused on the coast.

From pollution hazard towards new "repairing landscapes": a case study

The Piscinas and the Naracauli rivers, along with other minor ones, underlie the orographic and hydrographic system which stretches from the Piscinas's sandy beach to the dismissed mining area of Montevecchio-Ingurtosu-Gennamari. A wide project area where the traces of the ancient mining activities are still visible, not so much for the industrial heritage which is mainly concentrated around the mines and the abandoned villages, but as for the anomalies that occasionally mark an apparently uncontaminated landscape, considered one of the most outstanding natural reserves in the Mediterranean.
The so-called "Red" and "White" Rivers (i.e. the Piscinas and the Naracauli rivers) crossing the reserve's extensive dune system (fig.3) witness one of the main environmental problems affecting the area: the presence, in surface and ground waters, of cadmium, lead, arsenic, zinc, nickel and other heavy metals, due to infiltration and surface drainage from underground mining operations, landfills and dust accumulations.
Pollution problems have also affected the economic feasibility of the whole Geological and Mining Park area's regeneration, promoted by local authorities during the last few years: the attempt to involve private corporations in the industrial heritage recovery and real

2 / The Master thesis project is titled: "Peasaggi Disturbati. Costruzione di nuove opportunità per la risignificazione dell'ex zona mineraria d'Ingurtosu Naracauli Gennamari Sardegna". Candidate: Sara Cuccu. Supervisor: Luca Emanueli. Co-supervisors: Roberta Fusari, Michele Bottarelli.
3 / The Master thesis project is titled: "Oltre mare. Verso l'interno della Sardegna, risorse e ospitalità del turismo alternativo alla costa. Candidate: Silvia Corgiolu. Supervisors: Luca Emanueli, Gianni Lobosco.

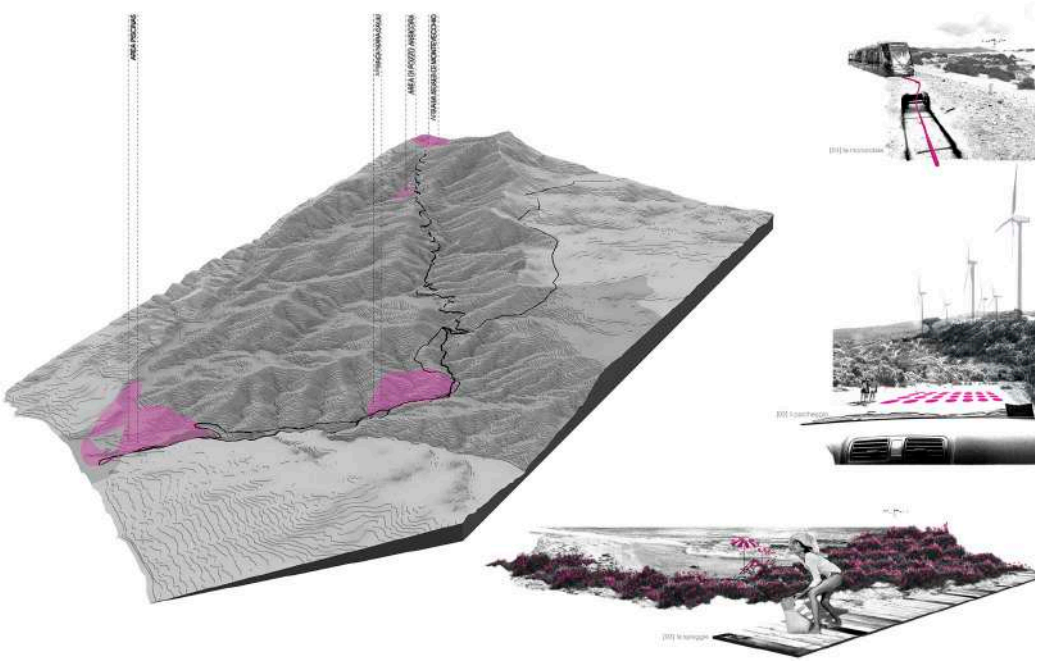


Fig4 / The expected risk assessment pinpointing priority remediation areas
source / Sara Cuccu's Master Thesis

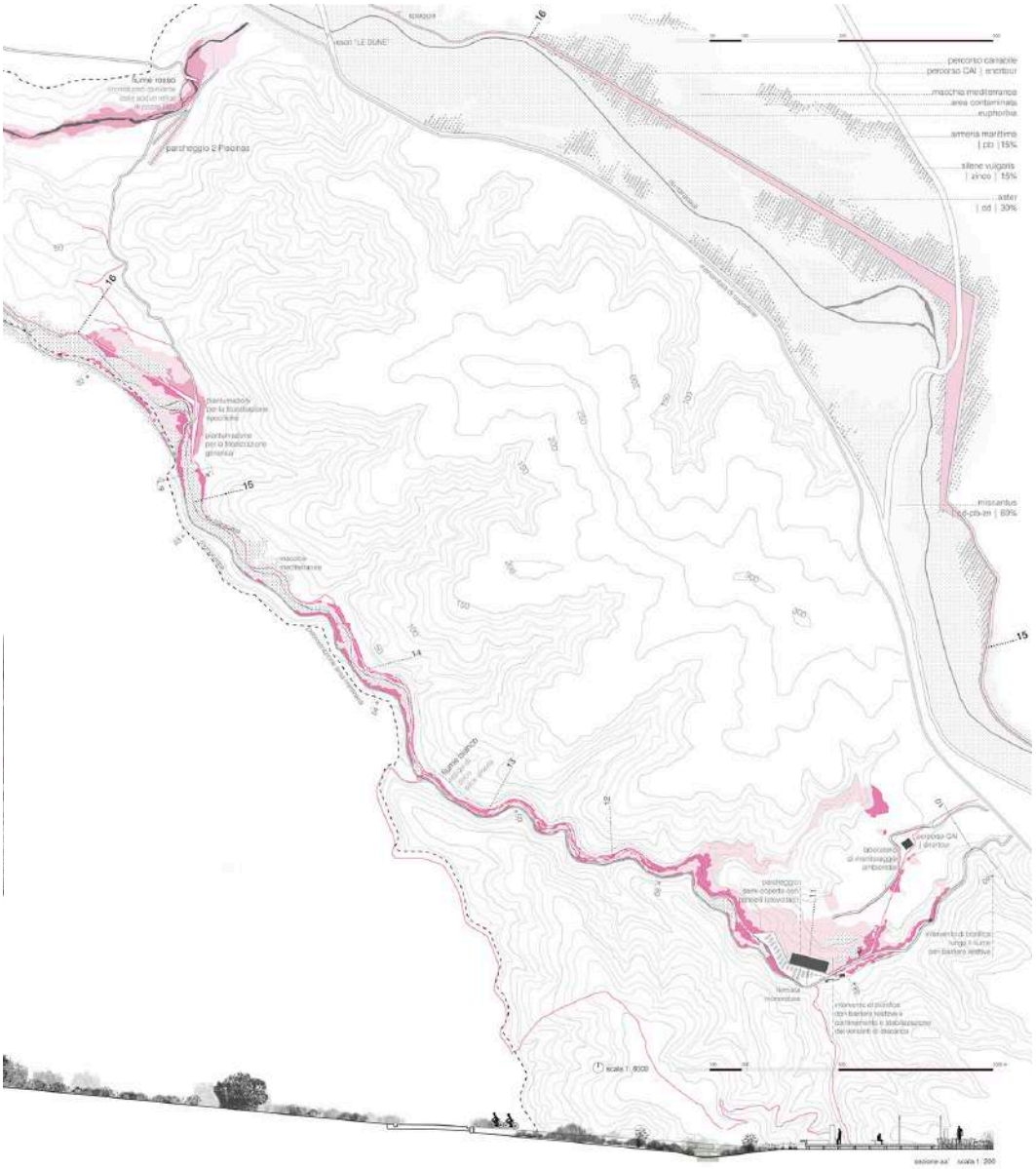


Fig4 / The phytoremediation "repairing landscape" along the Piscinas and the Naracauli rivers
source / Sara Cuccu's Master Thesis

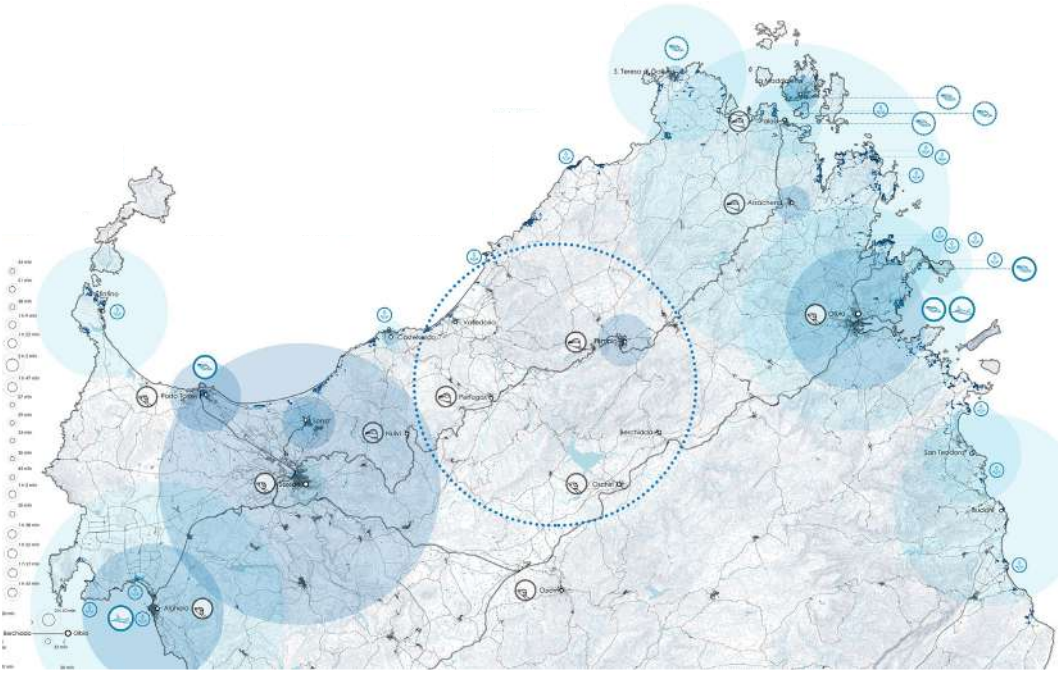


Fig6 / The Coghinas Rives basin placement among the the two main tourist destinations of northern Sardinia. source / Silvia Corgiolu's Master Thesis

estate re-development has failed mainly because of remediation high costs.
Anyway, such enduring status of abandon has gradually created a peculiar landscape where things and habitats blend into a whole ecology (Morton, 2007) whose charming balance already attracts a certain type of tourism that would grow if sustained by a proper strategy.
Following these assumptions, the project addresses the site reclamation spotting those areas where existing tourist flows overlap major risk zones, pinpointed by a carefully expected risk assessment (fig.4). This way, re-organising the Park services such as parkings, tourist facilities, sightseeing paths, etc., the strategy enables to start a progressive remediation process, economically more sustainable and well-targeted on real site fruition behaviours.
A set of additional functions and infrastructural works aims at enhancing the Park's visitors experience providing new elements on the landscape, reinterpreting under a contemporary perspective the site ancient productive purpose: exploiting, this time, those renewable resources -such as wind and sun- the territory is so rich in.
The old mining street that runs through the area crossing its main rivers until the beach, is converted in an Energy route characterised by the presence of wind turbines and photovoltaic fields, corresponding to rest areas and parkings. The latter are placed in those brown-fields where soil containment, stabilisation and solidification have been chosen as the faster and most effective remediation techniques, given the users' concentration and the more extended periods of time that people spend there.
Among the other cores of the system, and especially along the new trails bordering the waterways, the approach is based on more progressive and cost-effective procedures, such as phytoremediation or the application of permeable reactive barriers (i.e. PRBs) aimed at preventing pollutants migration and therefore the contamination extent (fig.5).
In summary, by adding further "repairing" layers to the landscape (Lobosco, 2016), the project attempts to steer the area towards an improved morphological and ecological configuration which will be possibly able to engender new meanings and opportunities for its sustainable development.

From flood risk towards new "performative landscapes": a case study

Sardinia's northern littoral hosts more than half of the regional touristic overnight stays (according to data provided by the Sardinia Region Statistics Service in 2014) and it is by far the area where the Tourism Pressure Index, as defined by Hadwen, Arthington and Mosisch (2003), reaches the higher scores. Here accommodation facilities and tourism settlements follow the established pattern of the resort-oriented sunbathing holiday, whose basic relationship with the context deals with static gazes upon a reassuring landscape.
The need and the will to attract different types of tourists (like backpackers or trekkers) on this island's section require to uncover and make operational those

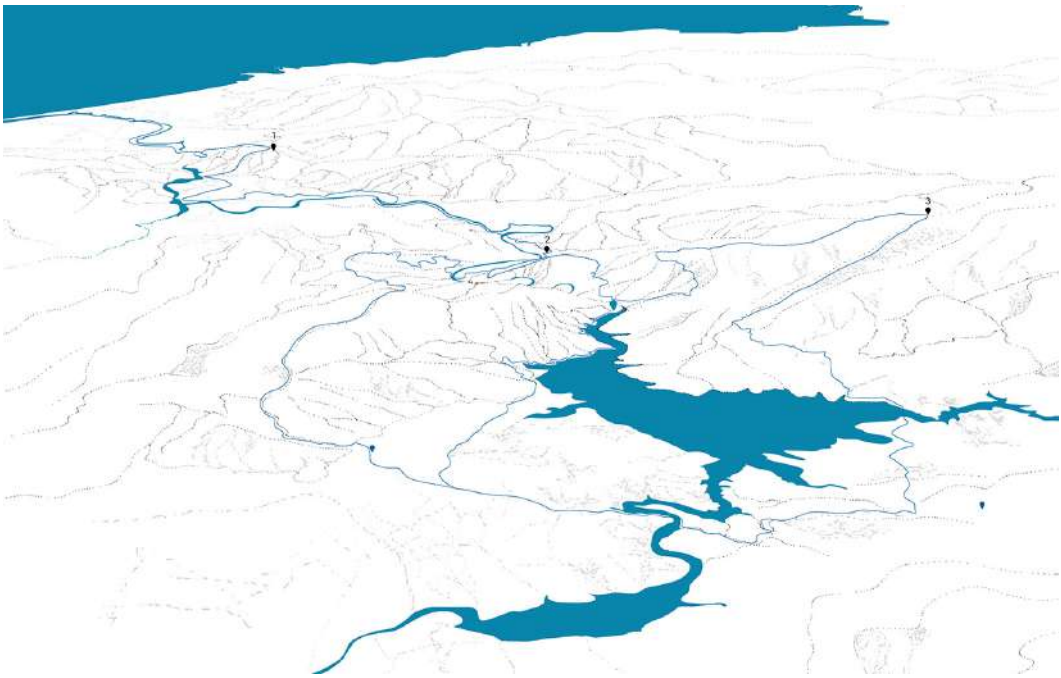


Fig7 / The project's alternative strategy to address the flood risk management on the valley source / Silvia Corgiolu's Master Thesis

territorial devices such as rivers, for instance, which would support a more dynamic and immersive experience of the landscape.

Under this perspective, the Coghinas's river basin represents a potentially strategic asset (fig.6): its geographic location straddling the two most attractive parts of northern Sardinia assures a large pool of tourist catchment and a good accessibility level; its variety of anthropic landscapes and ecosystems allows to envision a diverse range of fruition opportunities to be explored. As the Coghinas's path stretches along about 123 Km, passing through two hydroelectric reservoirs (the Coghinas and the Casteldoria lakes) before reaching the alluvial valley and flowing into the Asinara's Gulf, the project strategy focuses on developing a set of works aimed at fostering the territorial itinerant enjoyment by resolving two orders of issues.

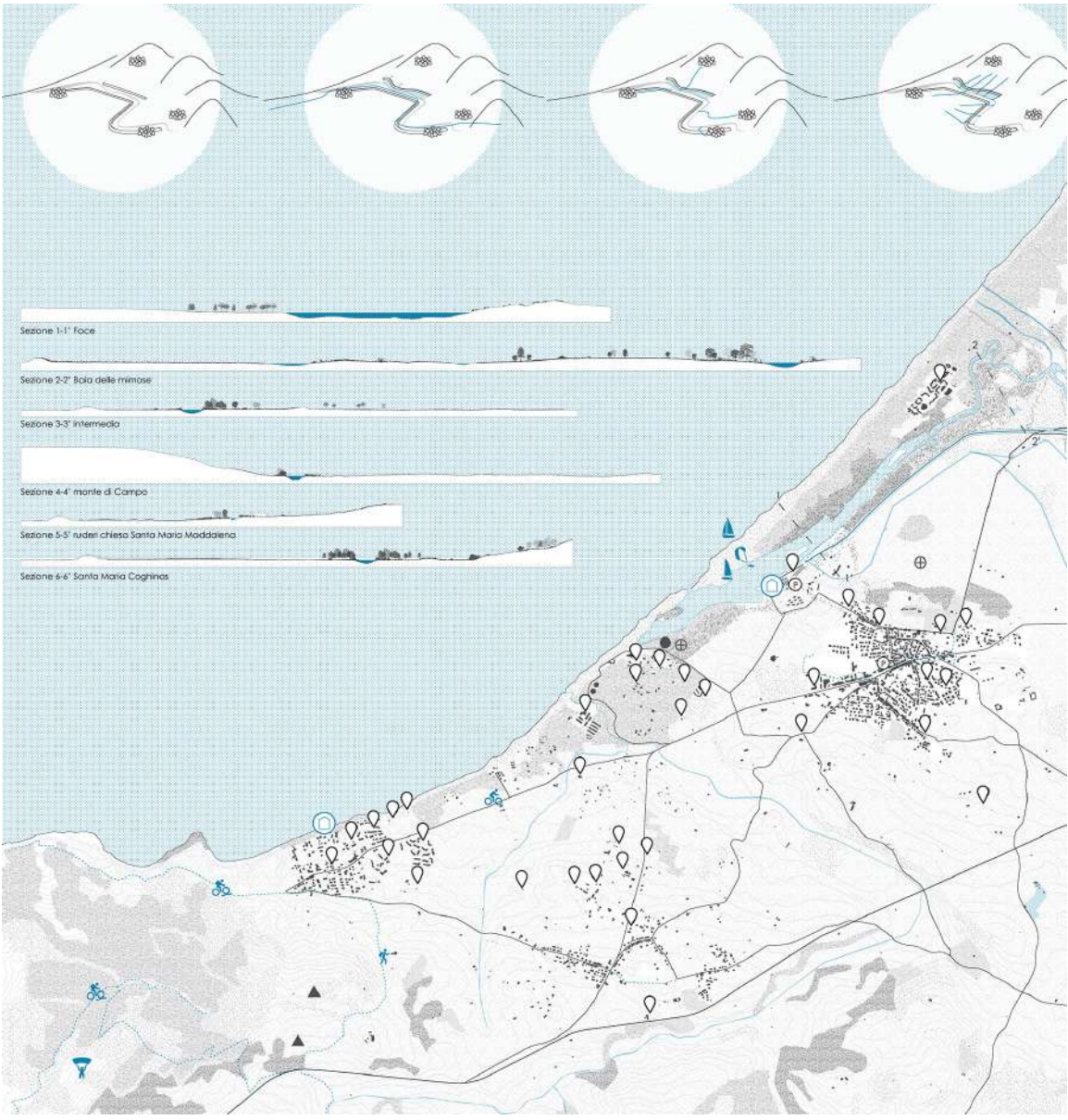
The first one concerns the accommodation topic: it is addressed by a network of shelters that recall the traditional temporary housing types of the rural Sardinia. They are designed to host groups of travellers (maximum eight people) along the route next to - or just above - the waterway and the lakes; they are arranged to set the trip stages according to well-defined, time-based evaluations. The shelters' typology changes depending on the context morphology, especially where the local hydrometric level variations are higher and require to put in place floating platforms or stilt house technologies.

Beside such light infrastructural system, that mostly concerns the two lakes' borders, the proposal faces the challenge of transforming the current riverbanks' configuration on the valley, in order to provide the territory with a new relational space voted in recreational activities, sports and events.

In order to reach this goal, the project (fig.7) revises the adopted Flood Risk Management Plan (i.e. "Piano di Stralcio delle Fasce Fluviali" plus "Piano Generale Rischio Alluvioni") whose expected defensive works may radically affect the continuity between the valley and the river raising (2,5 m) and strengthening the existing left bank while demolishing the right one.

The proposed alternative solution reshapes the dune landscape around the river mouth, so as to create an artificial flood plain (i.e. flood bypass) designed to convey the waters excess in extreme conditions, corresponding to a 50-years recurrence interval. This intervention could consequently enable to keep the current height for the left riverbank - which is intended to accommodate cycling routes and trails - allowing to invest in the right one redesign, free from flood risk constraints. Here, a series of public spaces, equipments, facilities and functional areas (for events, sports activities, camping, etc.) compose a "performative landscape" that puts the river at the centre of a new touristic scenario (fig.8).

Thus transformed, the entire fluvial system would be a unique attraction capable to improve and diversify the local touristic offer balancing safeguard necessities, economic expectations and development perspectives.



Relying on instability

In the previous paragraphs, we have briefly discussed how morphodynamic representation has radically changed our awareness of river systems' evolution. Then, in order to avoid any bias at a design level, we have stated the importance to equate climate, geological and human alterations' impacts on rivers' landscapes and ecologies.

Finally, we have suggested that the recurring operative way in which such physical transformations are normally managed is still too sector-based and that the role of landscape design and planning is neglected.

We have shown Sealine's "Research through design" approach (Lenzholzer, Duchhart and Koh, 2013) to the waterscape topic, analysing in particular two applicative case-studies in which both environmental risk management and tourism development act as strategic drivers motivating landscape transformations.

Both the presented project proposals are aimed at developing an original and contemporary interpretation of the "cultural landscapes" idea (Sauer, 1925) especially regarding how it has been adopted by the World Heritage Committee (UNESCO, 2005) and successively discussed by the scientific community given the nature-culture distinction that it implicitly subtends.

As Pannell (2006) observes, such nature-culture dichotomy, and the complex of values it engenders, risks to polarise the debate and simplify the framework within which social and environmental processes take place and mix up.

She demonstrates, in World Heritage contexts, how the attitude at establishing sliding scales of value or cultural properties listed as illustrative of a "significant stage in human history" (UNESCO, 2005: 20)

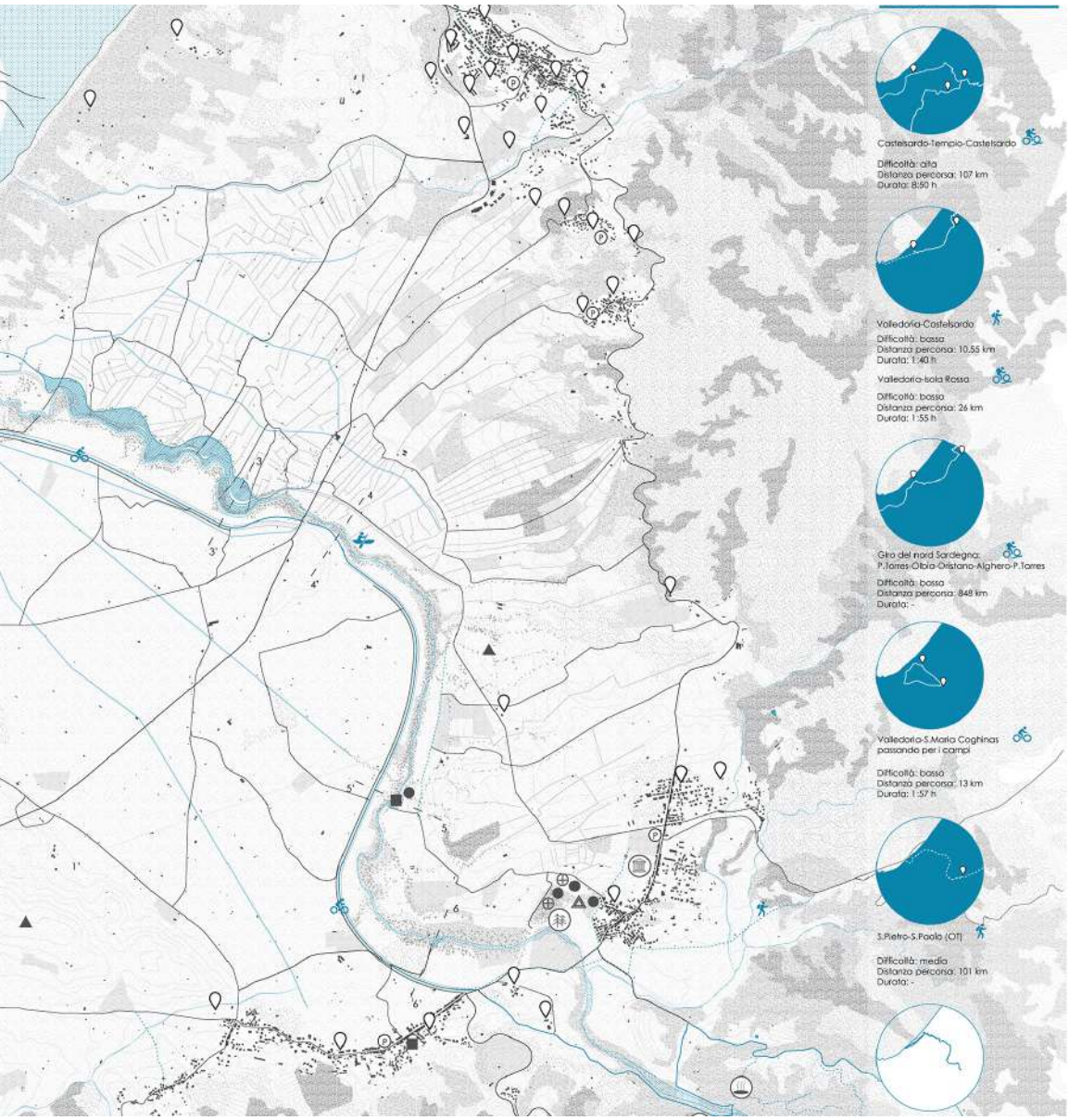
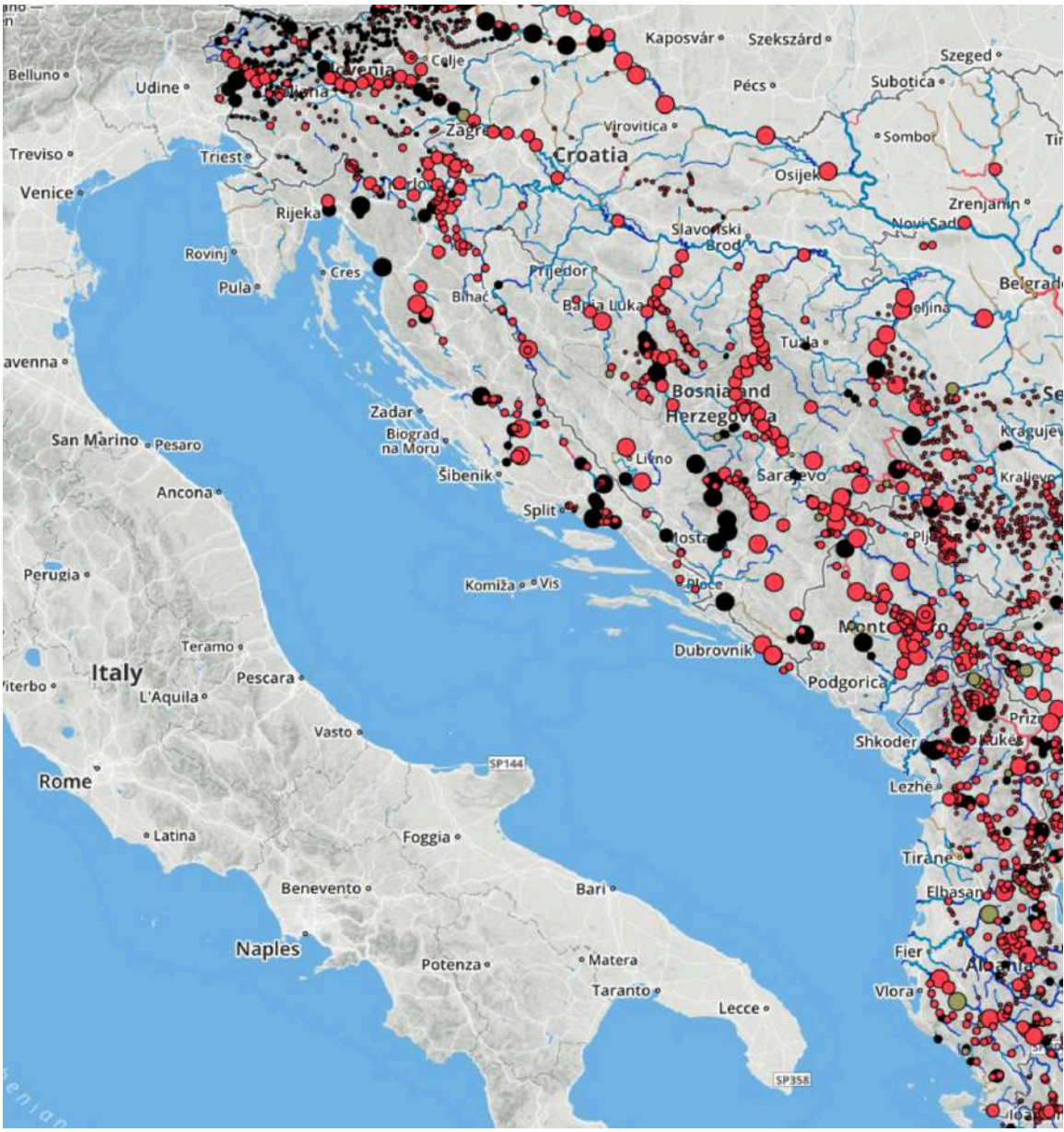


Fig8 / The "performative landscape" variations along the new Coghinas river banks source / Silvia Corgiolu's Master Thesis

can bring to "the sanitisation of history or the complete erasure of certain historic events" (Pannell, 2006: 4).
The same critique may apply to the aforementioned way in which landscape planning is commonly carried on and arbitrary referred to a singular moment in the history of the territory to which it belongs. River systems perfectly show the impossibility of such approach: unless we want to perpetuate the nature-culture distinction and its consequences, we should attempt to conceive the landscape as a stratification of always new arrangements, layouts and usages.
In this perspective, our research contribution in the last few years has focused on what we consider essential to this purpose: to work on forthcoming landscapes, able to fit with contemporary culture and processes.
For this reason, we assume that projects and proposals aiming at this objective should:
/ consider river engineering and infrastructural works as a stage of the incessant re-configuration of rivers' systems, going beyond the opposition between natural and artificial landscapes;
/ recognise activities like tourism and recreation the same way as agriculture or industrialisation, as prospective producers of unprecedented and brand new landscapes;
/ emphasise the multiplicity of landscapes and environments that over time and space overlap along river basins.

Such theoretical guidelines may find further and interesting applications in those territories which are now experiencing huge hydro-morphological developments, due to the increasing demand of water or energy supply, as well as the necessity of floods control.
Under this perspective, the Balkan Peninsula represents probably the most



relevant area in Europe where the conflict between socio-economic interests and environmental preservation requirements is about to explode.

According to the study produced in 2012 by the Austrian agency FLUVIUS, providing the first comprehensive large-scale overview of Balkan rivers, almost the 80% of the 35.000 Km of the examined watercourses were in a very good, good or acceptable morphological condition (Schwarz, 2012). Such data collide, for example, with the fact that almost 2.700 hydropower plants (including small systems with a capacity of 0-1 MW) are planned to be built on the entire area (fig.9) in order to guarantee additional energy sources for these young democracies' developing economies. Such circumstances get more complicated by the existence, along rivers, of hazardous industrial areas and infrastructures inherited by the Communist era and now dismissed.

The whole hydrography is set to change radically over the next few decades and the speed at which this is happening threatens to reiterate a mere technical-oriented approach leaving out more systemic opportunities aimed at reshaping social, cultural and economic networks.

In this framework, blurring the boundaries between disciplines - such as engineering, landscape planning, geography, economy, etc. - is a paramount concern to shift the viewpoint having a more holistic approach to the subject of waterscapes evolution.

Furthermore, even though a spatial planning approach needs to be implemented in order to evaluate environmental cost-benefits of infrastructural works, the forthcoming landscape that such inevitable transformations underlie will be also the result of a cultural attitude towards the concepts of instability and change which

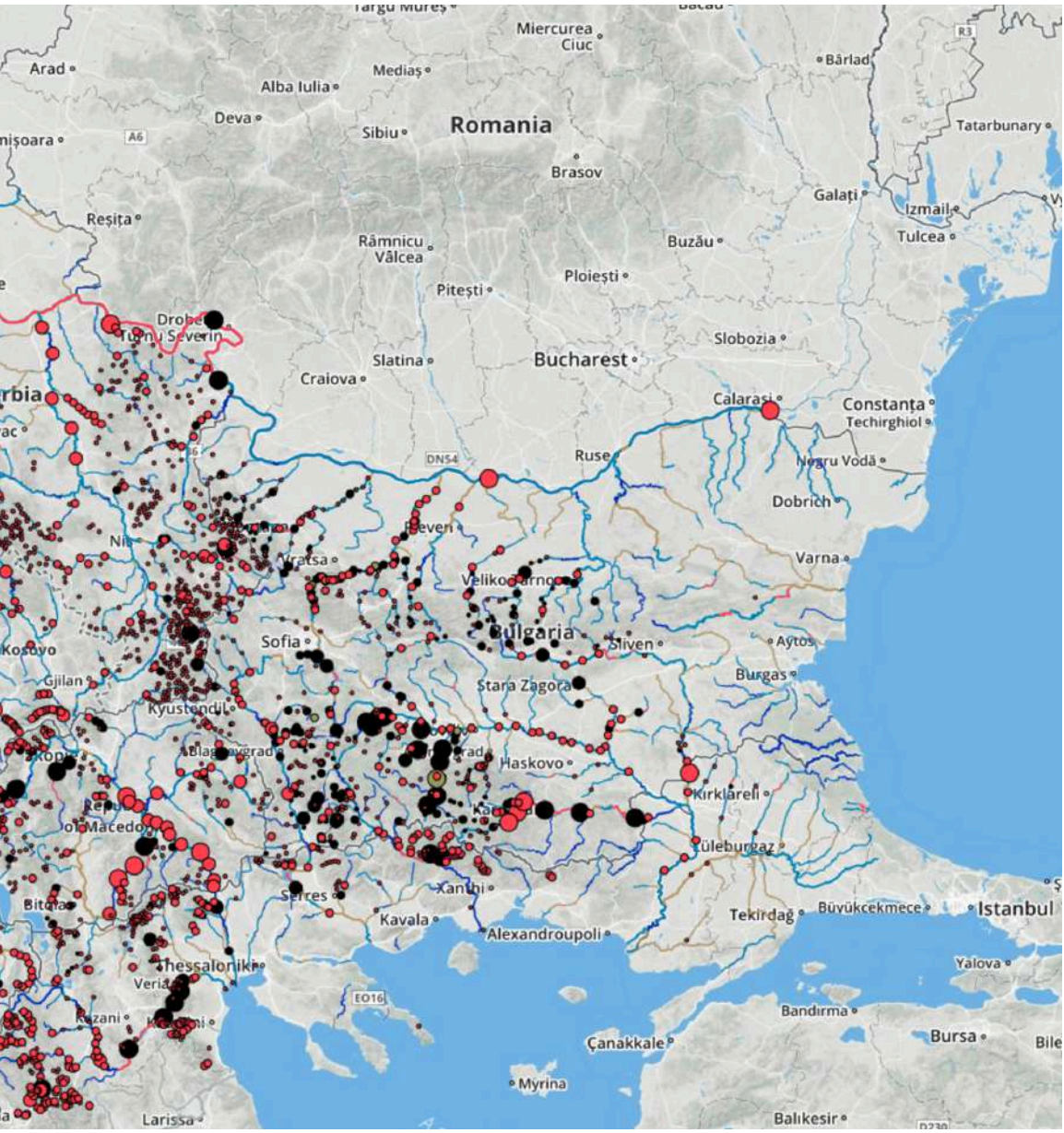


Fig9 / Existing (black), under construction (grey) and planned (red) hydropower plants of the Balkan Peninsula. source / Save the Blue Heart of Europe, www.balkanrivers.net

mark - as we tried to demonstrate - the inner essence of river systems.

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A drought & flood resilience strategy for Berat

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Dr William Veerbeek / UNESCO IHE - Delft Institute for Water Education

Introduction

The Berat Island study centers around on a group of temporal islands (i.e. sand bars; sediment deposits) in the Osum River which are left bare during summer, when the river's base flow is limited. During the driest periods, only a small stream is flowing through Berat section, leaving most of the riverbed exposed. Apart from a bottleneck located on the west of the city, the river sections around Berat are relatively wide. This leaves the city with an unused wasteland, covered by temporal vegetation. Due to the flood hazard during winter, these river islands are left relatively untouched. Yet, the opportunity the islands provide for the city, might be seized given that there are either limited, or no interferences at all in the existing river sections.

The proposed approach attempts to seize that opportunity by introducing a development strategy for the islands that is both drought and flood resilient, but most importantly connects the dry riverbed with the city. The approach might not only be feasible for Berat, but might also provide a generic strategy for many of the other cities in Albania facing similar problems.

Resiliency / From fashion to guiding principle to cope with an uncertain future

'Resiliency' has replaced 'sustainability' as the next buzzword for many projects. Yet, the concept of resiliency has a solid body of scientific work in ecology and engineering (e.g. Holling, 1973; Hollnagel et al, 2007). The basic notion of resiliency is how a system copes and recovers, when it is experiencing conditions beyond its initial design criteria. This makes it especially fit for conditions that are clouded by future uncertainties: instead of being optimized to operate within a predetermined range of conditions, the system is designed to cope with a relatively wide range of different conditions. This can be achieved by making the system robust (i.e. making it able to withstand extreme conditions), or by making the system flexible (i.e. ensuring that it can be adapted in the future to cope with changing conditions).

Main challenges / Developing a robust river for all seasons

The seasonal variability in discharge of the Osum river is large: during summer the river's base flow barely sustains a small stream while in spring the steep river basin can cause peak discharge levels that almost mimic those of flash floods. Thus, coping with such extremes requires a design that can accommodate periods of drought, as well as abundance of water while ensuring value and use to the city of Berat. These observations change the focus: the issue is not only how to make Berat's islands and river bank more resilient to high discharge levels and subsequent floods, but maybe even more importantly, how to maintain the river during summer and early autumn, when water levels barely sustain a stream and the riverbed is dominated by sandbanks covered with low quality vegetation and deposited litter.

The seasonal variability in river discharge

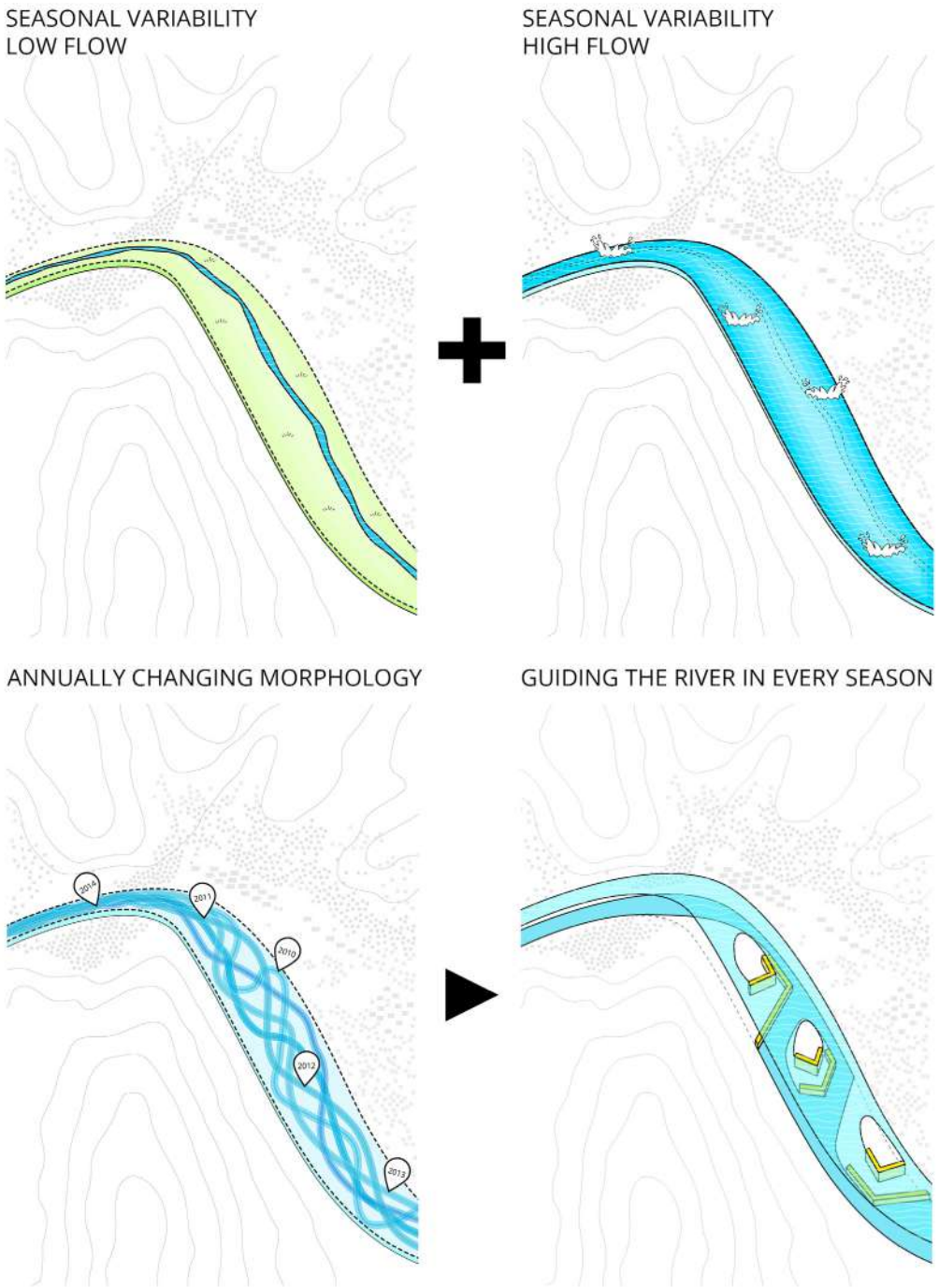


Fig 1 / Large variability of the river, better guidance of the river flows
source / Felixx Landscape Architects & Planners; Seasonal Isles

creates also another characteristic feature of the islands: the islands' morphology is continually changing. Compared to for instance many of the large river basins in the rest of Europe, the Osum river is relatively steep which causes high flow velocities. This results in high erosion levels and (partly due to the soil composition) a large sediment load during winter and spring. The erratic hydrodynamic behavior of the Osum River causes the sandbanks in the broad sections of the river to continually shift. While these dynamics might be regarded as a characteristic feature of the Berat river, they also limit, or even prevent actual use of the islands and hence their role as an active component of Berat city.

The hydrology of the Osum river defines to a large extent Berat's problematic position: Located on elevated and steep river banks the city is well prepared to cope with high water levels; flood hazard is limited to adjacent villages and towns located within the floodplains. Yet, during periods of low flow, the city is unable to profit from the river. The marginal stream-flow, the emerging sandbanks and the resulting amphibious river landscape only create an underused, low quality environment that does serve the characteristic of this UNESCO-protected city.

The outcome is therefore to develop Berat's river islands as resilient systems able to cope with the hydrologic conditions

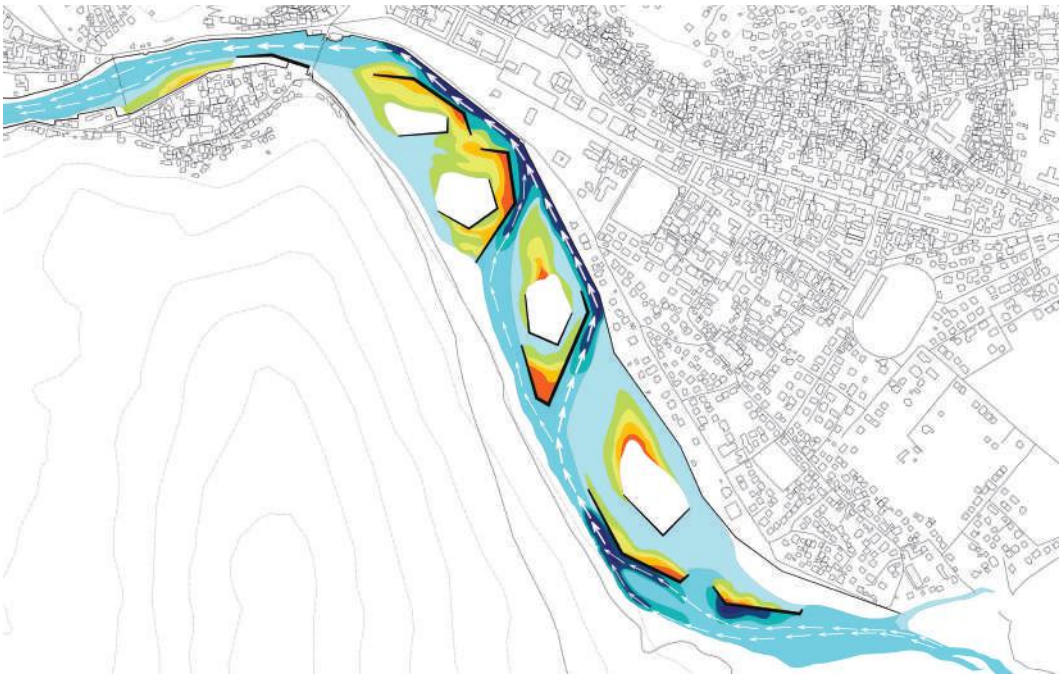


Fig2 / Position of structures in relation to streams of the water; sedimentation and excavation source / Felixx Landscape Architects & Planners; Seasonal Isles

associated to all seasons; to make the Berat islands both flood resilient and drought resilient; to be able to cope and recover from extremes, but most of all to develop an active use of the river (fig1).

Operational resilience / Building by nature, preparing for nature

Making interventions in the river bed does not necessarily imply the introduction of large scale structural measures; e.g. the introduction of quays, dams or other barriers that while ensuring a controlled steady flow during dry periods, create inflexible obstacles that limit the Osum River's discharge capacity during peaks in the wet seasons. Instead, it is possible to create a better 'guidance' of the river's hydrology by combining small interventions with the potential building capacity provided by the river's hydrodynamic: a controlled erosion and deposition of river sediment to create a relatively stable development of sandbanks and channels. Thus, by using the river flow and the resulting flood patterns due to the introduction of small obstacles (e.g. boulders, poles, etc.), we can shape the landscape, which during dry periods will constitute the sandbanks or 'islands'.

'Building with Nature'- Such an approach is not new: in various projects the hydrodynamic properties of water systems are used to change the morphology or flow patterns. For instance in the so-called Sand Engine project, beach and dune nourishment is achieved by using the tidal flows along the coast south of The Hague, Netherlands. The sand of a man-made peninsula, is distributed along the coast to maintain the beaches and dunes that protect the country against storm surges. In a similar fashion, boulders are used in many rivers surrounding Bergen, Norway to adjust the stream flows without the need for large, civil engineering-based structural interventions.

Currently, enough scientific knowledge in the field of fluvial geomorphology has been developed to create computer and/ or physical models that mimic the effects of small interventions (e.g. deflectors) in streams and rivers (e.g. Knighton, 1996). Depending on an initial classification (e.g. Rosgen, 1994) and the collection of adequate data describing the hydrological features of the river in combination with the river geology (including an analysis of the sediment), a precise model can be constructed to determine which places are likely for sediment deposition based on the location, shape and size of non-movable elements in the river bed. Likewise the resulting channel(s) that are sustained by higher flow velocities can be determined and located to where they provide the highest value to the city of Berat in terms of usability. Additionally, depending on the sediment size, small ridges can be constructed resulting in alternating riffles and pools of deeper water to ensure a minimal water level in the river section adjacent to Berat (fig2).

Especially in smaller streams, boulders (i.e. rocks), or tree trunks are often used to influence flow patterns and the stream morphology. For larger, more engineered

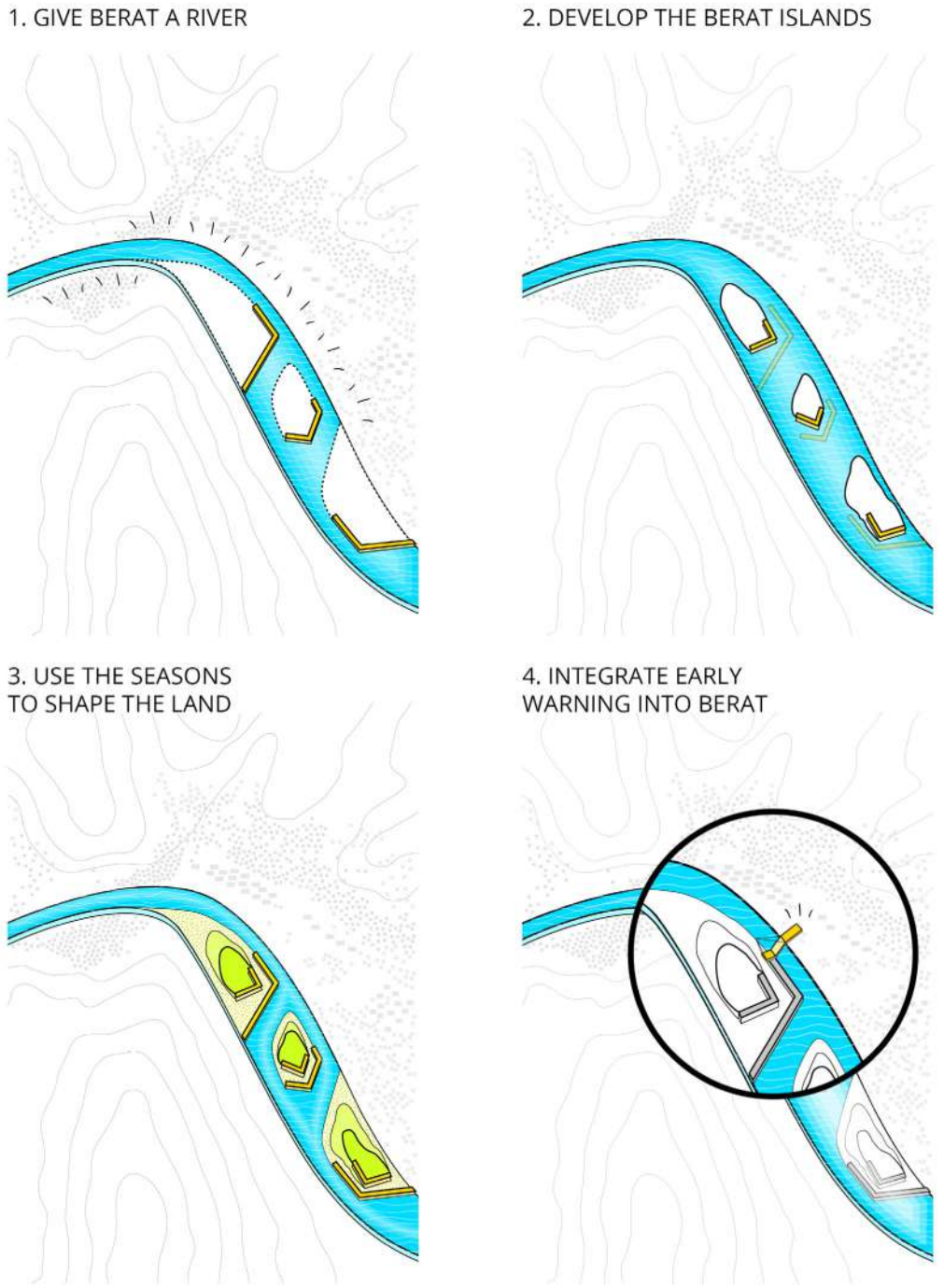


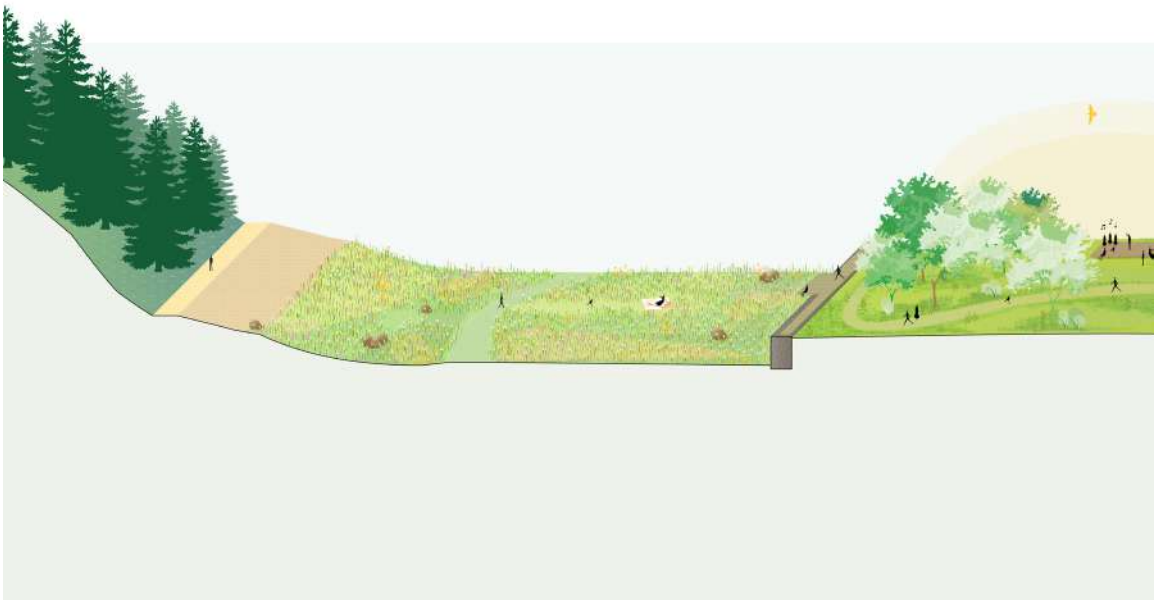
Fig3 / Controlled dynamics: design strategies
source / Felixx Landscape Architects & Planners; Seasonal Isles

solutions, the use of gabion baskets is often preferred. These are relatively cheap, flexible and have been extensively tested by reinforcing embankments in order to limit erosion as well as deflectors for the alteration of flow patterns.

Design strategies
Controlled dynamics

Manipulating the river flow patterns by a 'building with nature'-approach provides the tools to develop a design strategy that is not only resilient to both droughts and floods, but also enhances the usability of the islands by providing a more robust basis for use. The strategy consists of 4 main pillars (fig3):

1. Give Berat a river: ensure a minimal, steady stream-flow during dry periods along a steady trajectory (i.e. channel). The river is guided by a first system of low curbs.
2. Develop the Berat islands: by partially protecting the crests of the existing sandbanks, the contours of the islands are to a certain extent stabilized. The islands therefore become more robust and better equipped for vegetation and hosting activities. The river is guided by a second system of higher curbs.
3. Use the seasons to shape the land: by carefully adjusting to the different water levels associated to the seasonal variability in river discharge, a design can



be developed, in which the islands shrink and grow, reaching a minimal footprint during winter and early spring, when water levels are highest, and a maximal extent during summer, when only a steady stream-flow is reached.
4. Integrate early warning into Berat: extreme peak flows during winter and early spring could provide a possible flood hazard for Berat. Climate change will only exacerbate those extremes in the coming decades. It is therefore essential to not only develop an early warning system for floods, but also to manifest the warning in the city of Berat to ensure awareness among Berat's citizens and to restore the relation to the river by creating visible signposts. The bridge, used to make the islands accessible, could be opened when flash floods are coming. As such the opened bridge prevents the accessibility of the islands, and functions as a striking mark to warn the inhabitants of Berat for the high water.

These main focus points provide the basic framework from which the design is developed. Instead of focusing on objects or functions, the proposal is approached from the different seasons and the associated river characteristics.

Low water isles: summer & autumn
During the summer, Berat becomes alive. The city is vibrant and tourism flourishes, which means that the riverfront should add to the city's scenery.

By introducing a low curb into the riverbed, the modest base flow is directed into a single stream predominantly adjacent to the Northern quay. The curb is widened to create a walking path along the canal; a second quay that provides a new routing through and along the 'summer version' of the Osum River. The new quay is connected to the city by a new bridge. Apart from providing a pedestrian walkway along the river, the curb-quays act as the perimeter of the largest set of islands: the first terrace level that becomes available when the sandbanks dry out during summer. Although providing the largest area, these flower gardens exist only for a few months annually; on average from mid-July until late September.

That requires a vegetation that can flourish within only a few months, but can be sustained when (partially) submerged when the water level raises (see Winter and Spring). This flower plane is criss-crossed with mown trails. The 'tail' of the islands, which unlike the 'head' is not protected by a curb, is dynamic and moves depending on the seasonal deposition of sediments during winter and spring.

A second higher curb system, providing the perimeter for a second terrace layer, covers a set of smaller islands when stream-flows are somewhat more substantial. Due to this protecting curb, this terrace level emerges during a longer period, which means that the vegetation options are wider. Grasslands with bushes and trees create a park-like environment that adds to the public realm of Berat. It offers a place for residents to stay, and festivities to be organized.

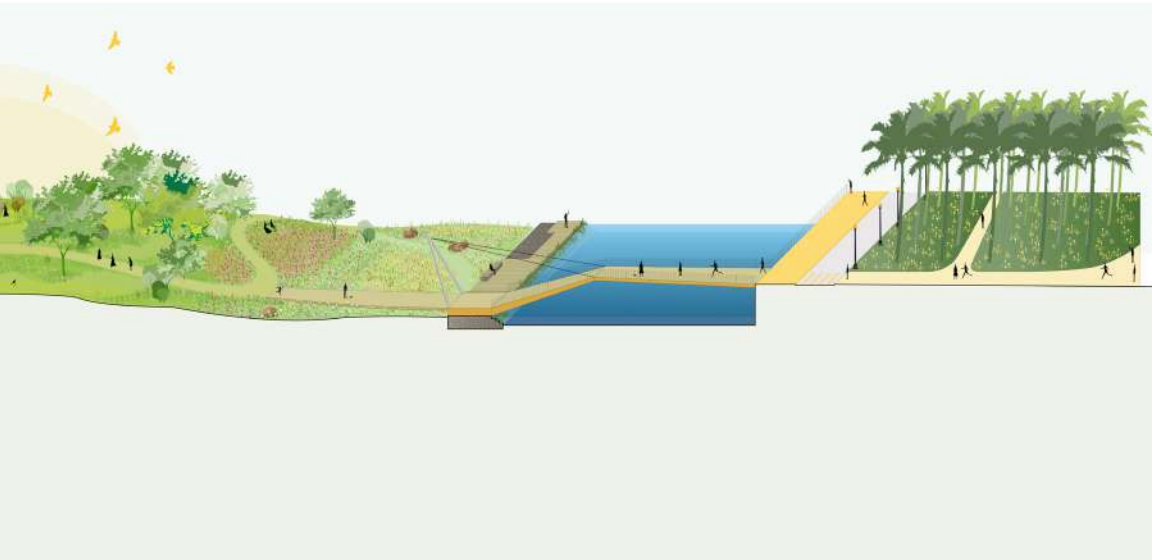


Fig4 / River section, low water level
source / Felixx Landscape Architects & Planners; Seasonal Isles

The curbs are covered with wooden boardwalks. The low and higher curbs are connected with these boardwalks through the first terrace level, preserving a smooth connection through the entire islands in every season (fig4).

Low to high water isles: winter & spring

During winter and spring the discharge levels of the Osum River increase. The lowest curb level (and terrace) is overflown at certain spots, which effectively means that the 'summer version' of the Osum River is widened. The summer gardens are now gradually submerged and transforming into seasonal wetlands. The flowering zones are overflown by small streams and ponds, the former mown reed paths transform into full-grown reed beds.

Small boulders (i.e. rocks) or tree trunks are used to steer the flow of the streams. The level of inundation depends on the flow rate of the river, and varies constantly through the season, creating an everyday changing landscape.

The higher islands stay protected from the stream, as they are covered by the higher curbs. The grasslands are managed less intensively during this timeframe, creating a safe haven for birds and animals. The first terrace levels stays accessible through the boardwalks, preserving as well the connection from the city to the islands (fig5).

High to peak water isles: designing for exceedance

During certain periods in winter and spring, the water level in the Osum River reaches the highest stages. While the first terrace level, including the curbs that mark the perimeters, are overflown by water, a small set of islands remains, the winter islands. This last set of plateaus is no longer accessible for pedestrians, providing a last resort for animals and birds within a now formidable river that almost covers the complete cross section. Peak discharge levels, occurring with return periods of 10 years or more will overflow all river islands, including the winter islands with relatively high elevations. To accommodate such discharge levels, it is essential that the interventions within the river bed do not create significant narrowing of the river section, which could increase the flood hazard for Berat. It is crucial that the level of the winter islands never transcends the height level of the quay of the city, to enable the submersion the islands, to accommodate the required discharge level within the river basin. During these particular floods, the first and second curb system secure the terrace levels, so they are not washed away.

It is essential that high and especially peak water levels (and the associated flood hazard) are communicated to Berat. After all, the level of the quays, the street levels and elevation of the built-up areas are historically based on observed peak river levels. These levels provided safety for the inhabitants and ensured sustainable occupation. To re-inspire the century old relation to the Osum River, the rivers stages should become part of the city again. This is done by using the pedestrian bridge, which in case of high

river discharge (i.e. flood hazard) is turned upwards. Depending on the lead time, and the flood warning system, the bridges can be turned upwards hours prior to the peak levels are reached. This symbolic act can become a signpost for inhabitants, visitors to increase awareness and flood preparedness. This might be especially prudent in the coming decades, when climate change induced rainfall (possibly combined with snow melt) might boost river levels to unprecedented heights (fig6).

Creating multiple values / Increasing usability, identity and livability in Berat

The main aim of the project is to activate the islands both as new places for the local community and as emerging entities, able to take a role in guiding the flow of the water and therefore in turning a potential crisis (the flooding) into a collection of diverse opportunities. Essentially, the intervention deals with the allowing of a next step of human actions towards the river: starting from the riverbed and the historical creation of a community and the foundation of the city, to the contemporary involvement in the transformation and maintenance of the city's identity.

Fig5 / River section, high water level
source / Felixx Landscape Architects & Planners; Seasonal Isles

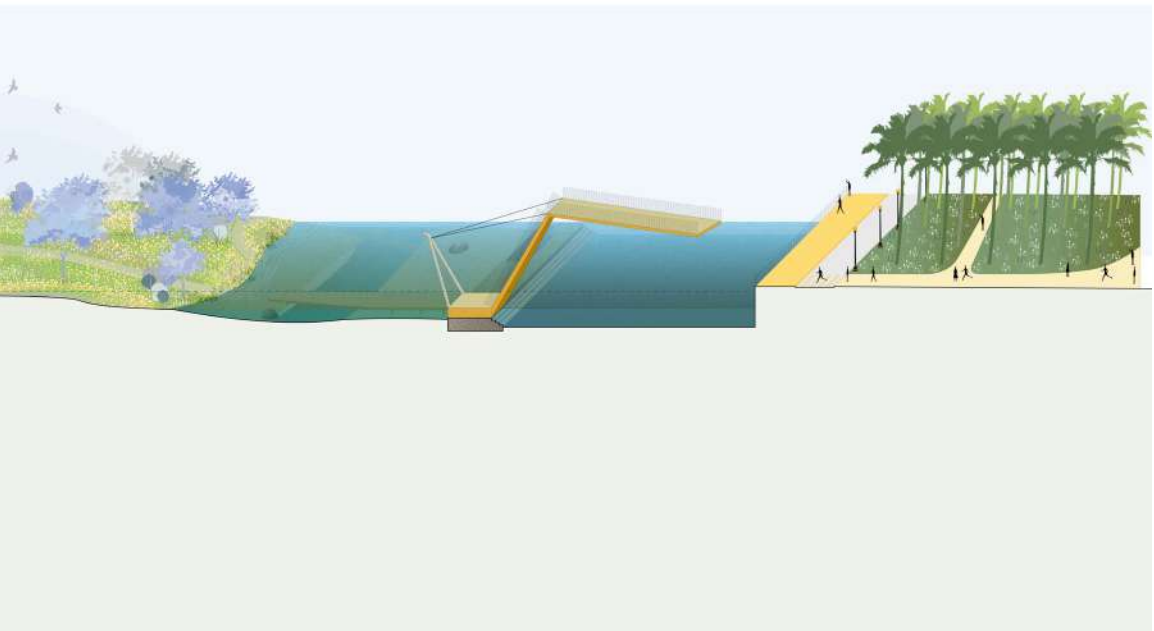


Fig6 / River section, peak water level
source / Felixx Landscape Architects & Planners; Seasonal Isles

Therefore the riverbed is regarded as the focus of the proposal. This position can be seen as an inversion of the common attitude. Rather than insisting on the river's borders, the center of the proposed actions is the riverbed, which is considered as the starting point to finally reach the urban environment. A trend is inversed: the city and the river, which are normally regarded as a dichotomy and therefore, as separated, opposites and antagonists, become coupled, aimed to give rise to a collaborative relationship between the natural and the artificial environment.

The history of many Albanian and Mediterranean cities is exactly the story of this coupling. As such, we would regard the project, as the attempt to establish a tandem, where the islands, the borders, the city and the local communities cooperate in the creation of multiple values and reciprocal benefits. The word tandem, which essentially refers to the ability of conducting and arranging things together, is activated through a series of landscape actions. Rather than focusing exclusively on the aesthetical side of the transformation, these actions attach flood risks through a landscape approach to new cultural possibilities. By reinforcing and making the islands a permanent part of the city environment, the flooding crisis

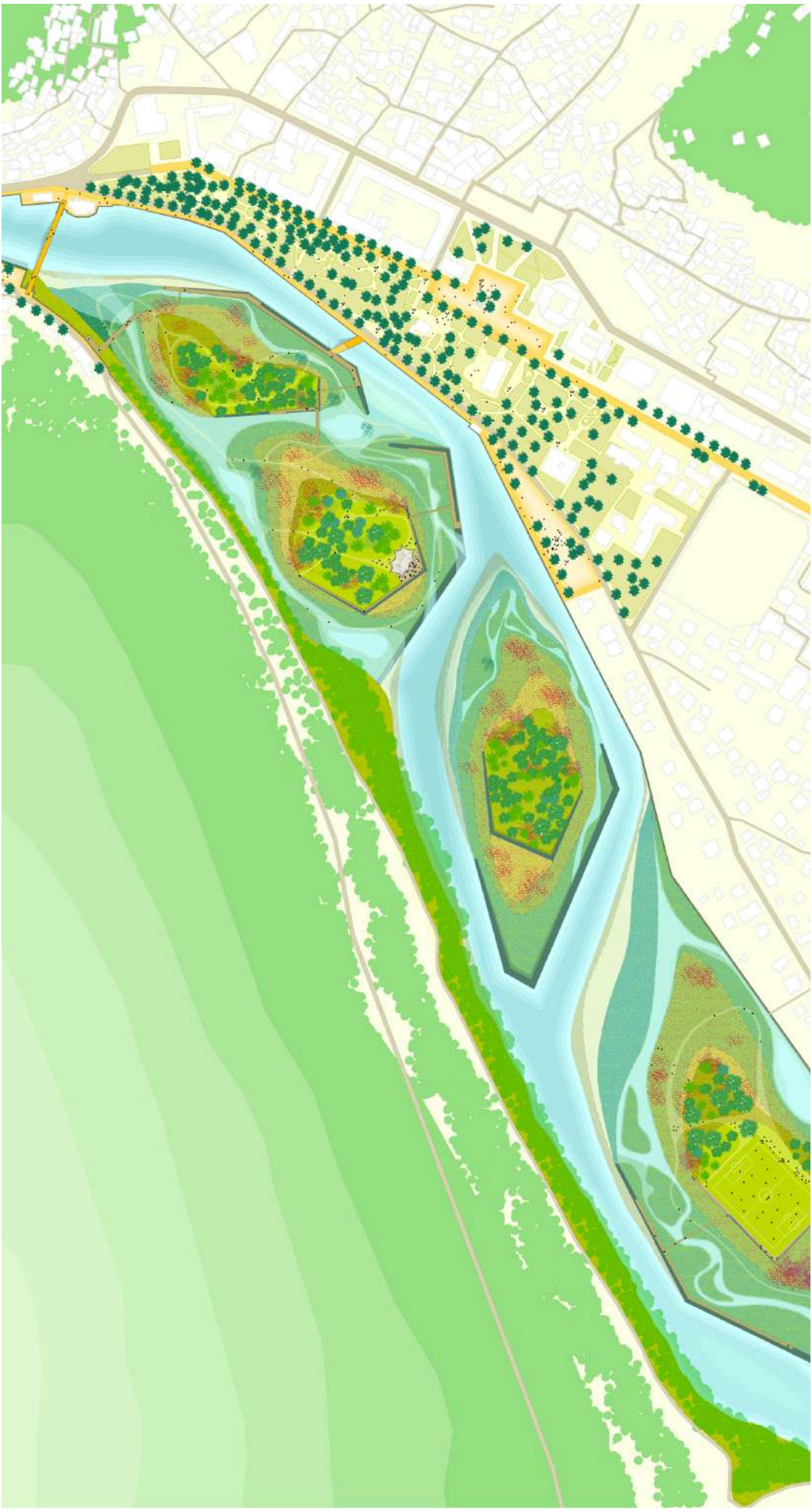


Fig7a / Illustrative plan drawing Berat, regional scale
source / Felixx Landscape Architects & Planners; Seasonal Isles

Fig7b / Illustrative plan drawing Berat, local scale
source / Felixx Landscape Architects & Planners; Seasonal Isles

can be treated integrally. The project involves new relations in terms of cultural usability. The three islands allow for compatible activities. The Northern island could have a recreational function and festivities, linked to the historical center. The Southern islands hosts functions, which are related to the ambient of the residential areas. The central islands might not be accessible, focusing on ecological enhancement (fig7a).

Increasing the uses on the islands involves a new possibility for the local community. Citizens (it might be for the first time) can watch the city from the riverbed, and through this get a better understanding of the values, arising from the relationships between the river and city, whereas each identity reinforces the other one. Along with activities like picnic, walking in the nature, sport etc., the fundamental activity of knowing the ecology of the places where someone lives, becomes more relevant. To specify the use and programming of the islands, the project seeks to generate several layers of citizen's involvement. This could result in a wide range of possibilities: from proposing the island as a kind of reservoir for the incrementing of local biodiversity, up to the organization of various activities and functions.

Additionally, Berat is an important heritage site, resulting in substantial inflow of visitors. The islands offer space to accommodate new leisure and sport activities, avoiding the undesirable transformation of the historical heritage of Berat to facilitate these functions. Moreover these functions could establish a meaningful interconnection between the historical and ecological values of Berat city. Avoiding a position towards only aiming at pure conservation, or on the opposite side the total transformability of important cultural heritage, the project creates a gentle negotiation between natural values, habits, needs and ecological crises, preferring more the way of compromise than that one of forcing. This attitude derives from the decision to handle the problem of water related stresses at the roots, suggesting an intervention, which is regarded as a new alliance between nature and human activities, as to allow the ground snatched from the waters of triggering a cycle of life where human activity is excluded. It is definitely an intervention, which works in terms of viability, as both the city and the river, through a renewed co-existence could create a new layer of Berat identity (fig7b).

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The shape of water

Arch Dong Sub Bertin
dsb office of landscape design, Milan

[...] There is little to do, he continues; "The water that descends on the slope in the basin - from which the spring comes out - comes from that gutter, which is upstream. The water just descends and it cannot trace a china or a tube "[...] If the river is visible water, exposed to the sky and the eyes of men, the gutter is Danube." [...] But who feeds the gutter, which hidden and ineffable river gods? Here the link fails, because the scientist believes in a rough gossip, which reports someone else's rumors. He tells that Maria Giuditta – who arrived first thanks to her long legs to look out the ground floor window – interrogated the old and grouch mistress. She found out how water comes to the gutter from a sink, which is constantly filled by a faucet that no one can close, connected to "a lead pipe - old as much as the house - which loses its way somewhere" (Magris, 1986).

Magris' fun story in "Danube" invites us not to take things too seriously when it comes to geography and landscape, since a "popular rumor" can become more convincing than any scientific theory.

In the last years riverscapes and, more in general, waterscapes have taken on an important role in the environmental rebalancing, within increasingly denser and extended cities. This is the case of many Chinese experiences that involve Turenscape landscape designers in river banks re-naturalization projects. Or, moving westward, London's Thames projects such as the bridge/park and the regeneration process of the areas where the Olympic Games were hosted. Not to mention, the ambitious and futuristic Manhattan Landscape Plan designed by BIG, who proposes the creation of a park along the banks of the world's most famous peninsula/island.

Shared opinions recognize in these projects' nature the configuration of resilient landscapes. Without questioning the exasperated use of the adjective "resilient" - which appears in several landscape architecture, urban design and architecture office manifestos, and in conference lecture posters around the world - it seems that this term alone can label a project as " innovative".

The large use of this adjective suggests that the potential solution to all the landscape problems is the application of a resilient approach and/or methodology.

So it is worth to dwell a bit more on the meaning withheld by this word.
"From an etymological point of view, resilience comes from Latin "resalio" - iterative of the verb "salio", to jump. Somebody suggests a interesting connection between the original meaning of "resalio" - which was mainly used to describe the gesture of jump again on a boat capsized by the power of the sea - and the current use in psychological language [Psychology has also been infected by the term]: both terms indicate the attitude of going ahead without giving up despite the difficulties." (Marzi, 2016).

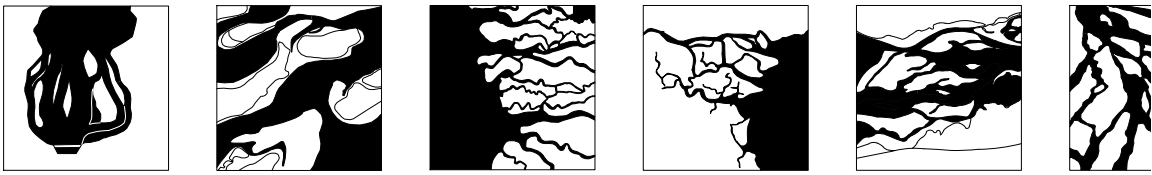
In a period of serious socio-economical crisis, the concept of resilience seems to lay the foundations for a new balance, thanks to an attitude of adaptation and

Fig1 / Yanweizhou Park in Jinhua City by Turenscape Landscape Architecture
source / landzine.com, published on August 25, 2014

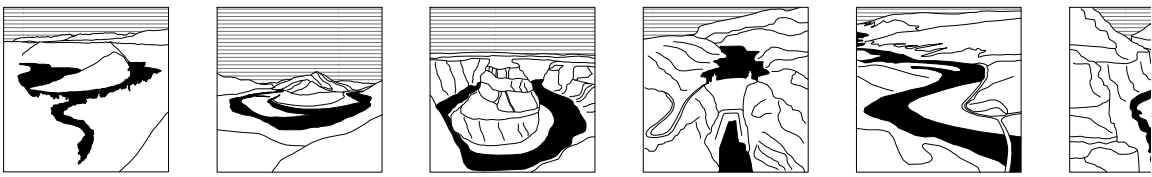
Fig2 / The BIG U project proposal for Manhattan by BIG Architects
source / archdaily.com, by Vanessa Quirk, published on April 4, 2014

Fig3 / The Garden Bridge project in London designed by Thomas Heatherwick
source / wired.com, oublished on January 1, 2014

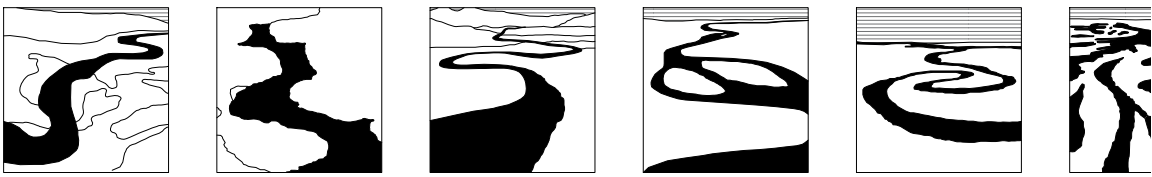
Morfologia fluviale



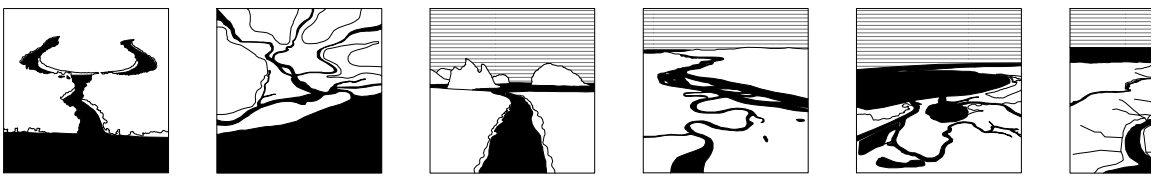
Valli fluviali e gole



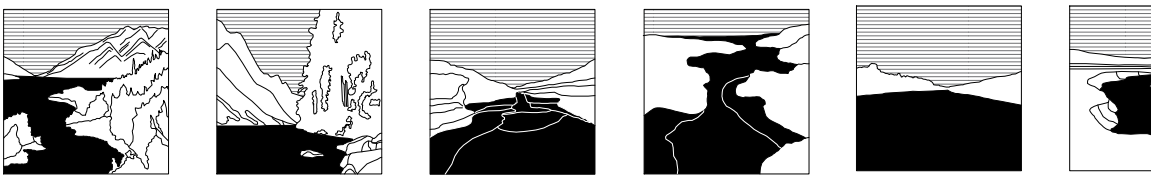
Meandri fluviali



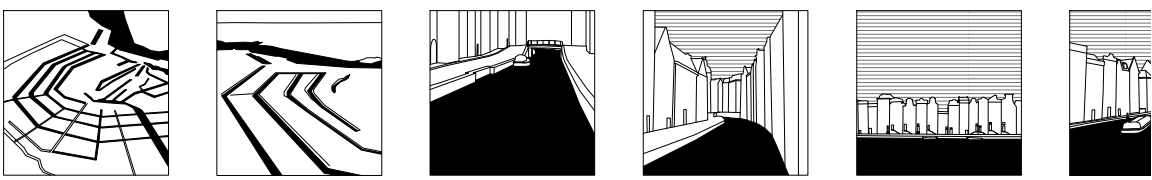
Foci fluviali



Panorami fluviali



Amsterdam - caso studio



Canali agricoli

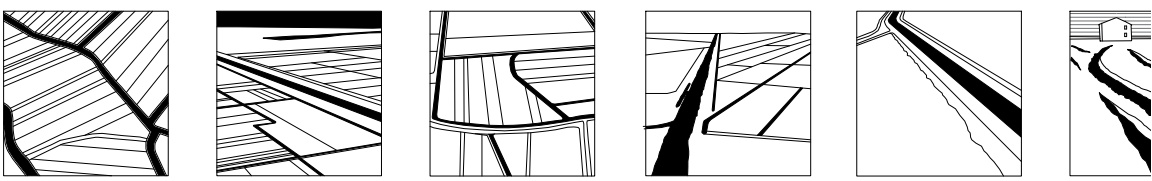


Fig4 / Example of re-drawn waterscapes
source / drawing by the author

resistance.
However in design terms, it can lead to a somewhat compliant and scarcely decisive approach that aims to welcome a "permanent deformation" of objectives by facilitating the "distortion" of a result.
This attitude neglects the existence of an inverse aspect to "Resilience", which nevertheless pervades many contexts of intervention: Fragility.

In particular:
- Fragility requires special care. In fact, we take care of the beautiful and valuable things.
- Fragility requires targeted and substantial attitudes (which cannot simply be labeled "resilient or fluid," as many now describe their projects).
- Fragility requires special attention, discipline and higher quality in the projects that will be realized.

Architecture must also guarantee a certain quality through the expression of forms that are capable of understanding situations, supporting a thought and suggesting a dream.

New appealing design trends often apply the image of Nature as a slogan – e.g. by covering new constructions with greenery (will future architectures be a large living vase?), but they actually neglect the high running and maintenance costs of such vegetation. In addition, these costs cause an excessive energy consumption (sign of great design fragility): could this architecture be resilient in the new urban landscape?
Architects should therefore renew their commitment to design projects that are able to improve our social and landscape context. I think it is very interesting to return to the physical gesture of drawing, after years of moving a mouse. The new graphic pens allow us to re-acquire a very important manual skill for our profession and they make us exercise the Art of Drawing.

Quoting Ruskin:
"For I am nearly convinced, that once we see keenly enough, there is very little difficult in drawing what we see", with an approach that stimulates and assists a "subtlety of vision". Also: "and I would rather teach drawing that my pupils may learn to love Nature, than teach the looking at Nature that they may learn to draw."

To apply the Ruskin's "Elements of Drawing" within a project means to use a design methodology aimed at comprehending the landscape context in order to acquire it and understand it in all its nuances.

And now, going back to the starting point and the title of this article – the shape of water – it is only through the comprehension of the strength characterizing the fluid, and the consistency of the soil which wraps the latter, that we will we be able to guide the hand in the drawing of form.
Moreover, the water movements can suggest a persuasive design thought themselves, both in natural contexts and anthropic landscapes (fig.4-5).

The re-drawing exercise will allow you to investigate and dwell the shape of water no longer as a "beautiful image", but as a system of relationships between lines and surfaces: a good starting point for a project.

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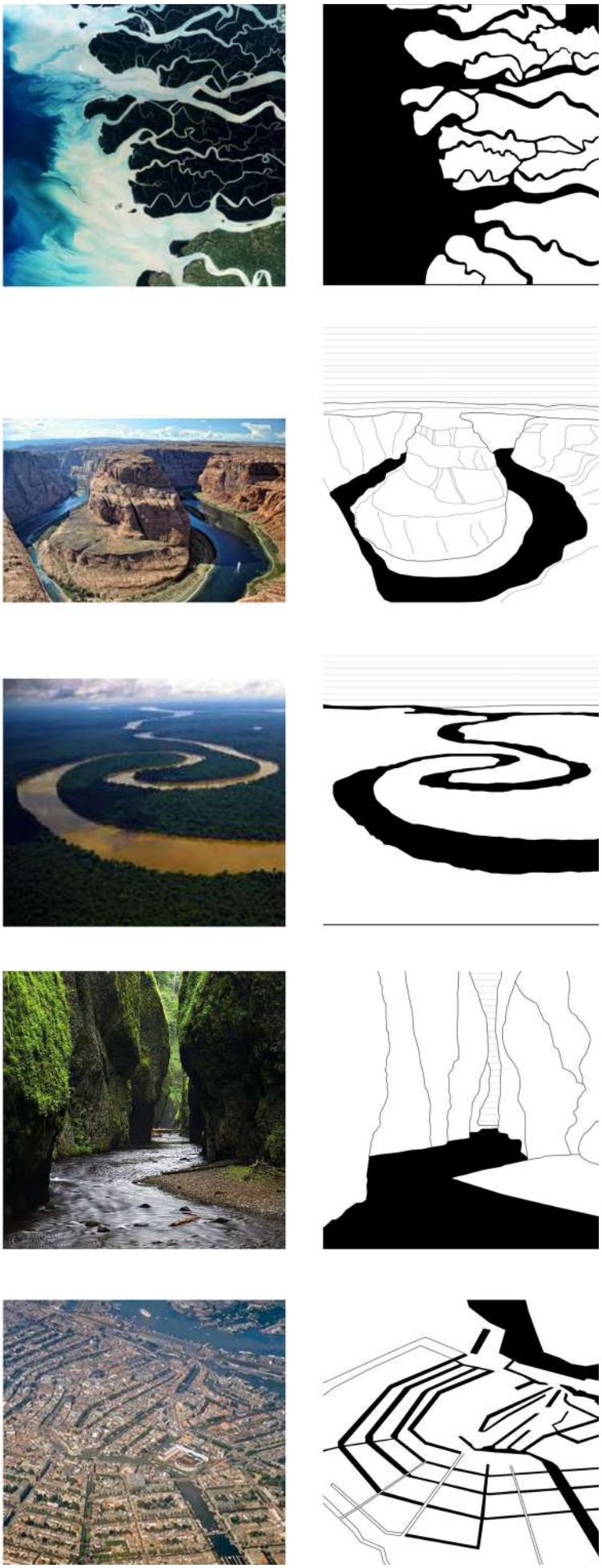

Fig5 / Taxonomy of water in natural and anthropic landscapes
source / drawing by the author

3

seman workshop

When a river flows into the sea / workshop report

text edited by Enrico Porfido / PhD researcher POLIS University

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Background[1]

In the last few years, the Albanian Government has started collecting ideas through international competitions, attempting to redefine a new strategy for the Albanian Southern Coastal Area. In particular, the aim of the competitions has been to revitalize and reconsider all the characteristics of the Albanian coast line in terms of tourism and landscape. At a later stage, the Albanian Government focused its interest on river basins, proposing another international competition for the area of Berat, that of the Osumi River in this specific case. The competition addressed the topic of the River and the Osumi Island, specifically in terms of their capacity to be resilient in case of flooding.

Drawing inspiration from this first experience, POLIS University and the IKZH Institute, through the Observatory of the Mediterranean Basin (OMB) - a new unit involved in the applied research field - started to explore a new way of investigating the Albanian landscape, merging PhD workshops with design research topics of present interest. In the framework of PhD activities, the workshop can be seen as an experience with the aim of improving the skills of each PhD student in terms of design approaches as well as research methods.

Considering the previous experience acquired with the Riviera competition, the river basin topic will give an additional contribution to the broader field of investigation related to the water domain in the Albanian landscape. The network created by the rivers, as study subject, can be seen as a natural system that links two different panoramas: the mountains, which constitute the central and the higher part of the country, and the sea.

The river basins in Albania generate a large percentage of water, an important natural resource which is still not fully explored, especially in terms of biological richness, biodiversity, and in terms of touristic potential. The relationship between water basins and historical landscape must be considered as an opportunity to reevaluate the role of the Albanian landscape within the frame of Mediterranean culture; a space of contradictions in which different identities have marked human history.

A well-known French historian, Fernand Braudel, described the Mediterranean as "A thousand things at once. Not a single Landscape, but several landscapes. Not a single sea, but a succession of seas. Not a unique civilization, but a series of civilizations stacked one on top of the other". This quotation highlights the importance of the Mediterranean in terms of diversity and multiplicity of identities. Through Braudel's eyes it is possible to

Fig1 / Albanian riviera panoramic view
source / Eranda Janku

Fig2 / Mediterranean map, drawing by John Thomson 1817
source / davidrumsey.com

view the history of different cultures and traditions, in which the concept of the Mediterranean Basin is seen as a common inspiration ground for all the countries that are washed by the Mediterranean Sea. Considering all the above reflections, one of the main objectives of this workshop was the identification of common characteristics in the riparian environment of the Mediterranean basin.

Introduction

For many years now, the European Union has been promoting several programs for conserving, protecting and developing the natural and cultural heritage. According to EUSAIR macro-region strategies and the Adrion program[2], Adriatic countries' watershed heritage is not fully exploited in terms of blue technology, touristic, environmental and connectivity potential. Following the European strategies of the Adriatic and Ionian Macro-Region, the workshop will be subdivided into four expertise fields, according to the four EUSAIR pillars: Blue Growth, Connecting the region, Environmental Quality and Sustainable Tourism.

The overall objective of Blue Growth is about driving innovative and maritime growth in the Adriatic-Ionian Region by promoting sustainable economic growth[3] and this objective can be reached by promoting research, adapting to sustainable seafood production and consumption, as well as improving sea basin governance.

The "Connecting the Region" challenge deals with the notable disparities between "old" EU state members and new ones. Its main objective is to strengthen reliable transport network and intermodal connection, especially maritime, and to achieve these aims, *better transport and energy connection are compelling needs for the macro-region and precondition for its economic and social development*[4].

Environmental Quality issues concern the ecological status of the marine and coastal environment, and aim at *reducing waste flows to the sea and nutrient flows and other pollutants to the rivers and the sea*[5].

The last important field of expertise based on the EUSAIR pillars is Sustainable Tourism which is focused on sustainable and responsible touristic potential of the Adriatic-Ionian region, promoting responsible tourism behaviour.

The aim of this workshop is to identify possible interesting areas around the Adriatic basin in order to define a new network, focusing more on an Albanian study case in a second phase. The analysis phase is the base for identifying common problems and potentialities and speculating about methodological solutions and possible applications.

The Albanian study case is the Seman River which is formed by the confluence of the rivers Osum and Devoll and flows into the Adriatic Sea. Crossing the western area of the country, it represents a perfect potential connecting point between inland-coast. Because of its morphology, the river can host strongly characterized pilot projects for different application fields.

The Seman River

The Seman river basin is located in the central region of Albania. The river crosses

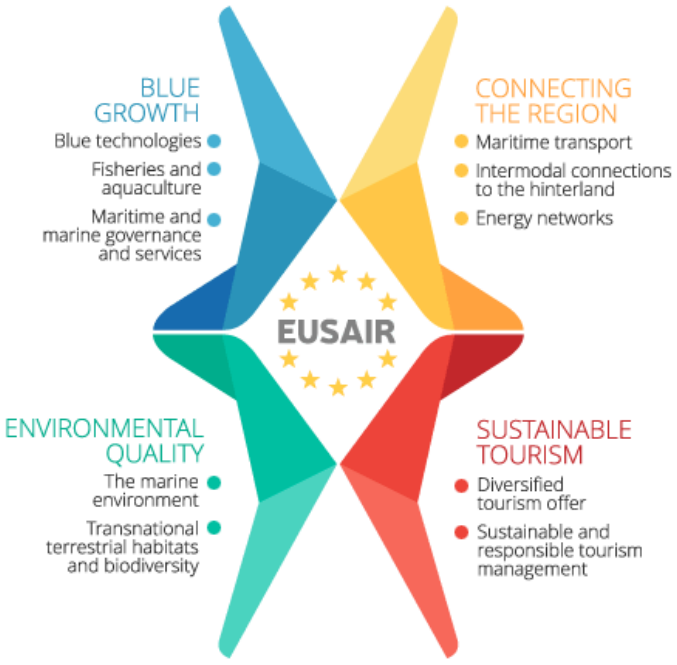


Fig3 / EUSAIR four pillars
source / Europeaan Commission Action Plan, 2014

and shapes different types of natural systems and landscapes, from the hills where Osum and Devoll rivers merge, becoming Seman, through flat areas where it provides water to urban settlements, to the coast where it flows into the sea.
The potential of this area in terms of economic and touristic development has been already recognized and enlightened in many studies as, for instance, the Albania 2030 Manifesto published by POLIS University in 2014. The main problem derives from the chemical industries and drilling-oil platforms that use it as landfill and then negatively influence all the surroundings. In its waters, large amounts of heavy metals and pollution are discharged. The same water is then used for watering fields and also collects the cities' confused drainage system.
In a region mostly characterized by farming activities and the leftover skeletons of a no-longer productive primary industry, the only solution is a regeneration process based on depollution, environmental restoration and enhancing the values of local heritage.

Methodology

The workshop was divided in three sessions. The first was based on a desk-research, during which PhD students, coordinated by their supervisors, went through maps and documents concerning the Albanian river basins and, more specifically, Seman. This phase also included lectures by professors on the Albanian context, water management and biodiversity. Afterward, a daily site visit was organized in order to provide the research tools for the following steps. The last four-day session held at POLIS University was focused on data analysis and strategy definition. Round tables and discussions were organized during this working session in order to provide a continuous feedback to the students. On the last day, a public presentation with the participation of external experts took place at POLIS University.

The working phases were five:
- phenomena observation on site during the field trip,
- individuation and organization of the

1 / The "Background and Introduction" paragraphs are taken and then edited from the workshop description.
2 / The Interreg V-B Adriatic-Ionian 2014-2020 (hereinafter ADRION), set up in the framework of the European Territorial Cooperation (ETC) - one of the objectives of the cohesion policy - includes 31 regions from four different ERDF Partner States and four IPA Partner States. The overall objective of the ADRION Programme is to act as a policy driver and governance innovator fostering European integration among Partner States (Albania, Bosnia and Herzegovina, Croatia, Greece, Italy, Montenegro, Serbia, Slovenia), taking advantage from the rich natural, cultural and human resources surrounding the Adriatic and Ionian seas and enhancing economic, social and territorial cohesion in the Programme area. The Programme takes into consideration the experience of the 2007-2013 Operational Programmes (OPs), in particular the transnational South-East Europe programme (SEE) and the cross-border programme IPA CBC Adriatic whose eligible areas overlap with those of ADRION. It also takes into account the results of the SEE in itinere evaluation and the overall programme achievements of the previous programming period.
3 / Definition from the Action Plan Accompanying the document COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS concerning the European Union Strategy for the Adriatic and Ionian Region, {COM(2014) 357 final} {SWD(2014) 191 final}, European Commission. Brussel 17.6.2014
4 and 5 / See above.

Fig4 / Site visit map
source / drawing by Enrico Porfido

main causes of problems,
- definition of a general strategy for the whole area,
- definition of strategic actions and
- design of toolkits for agro-puncture interventions.

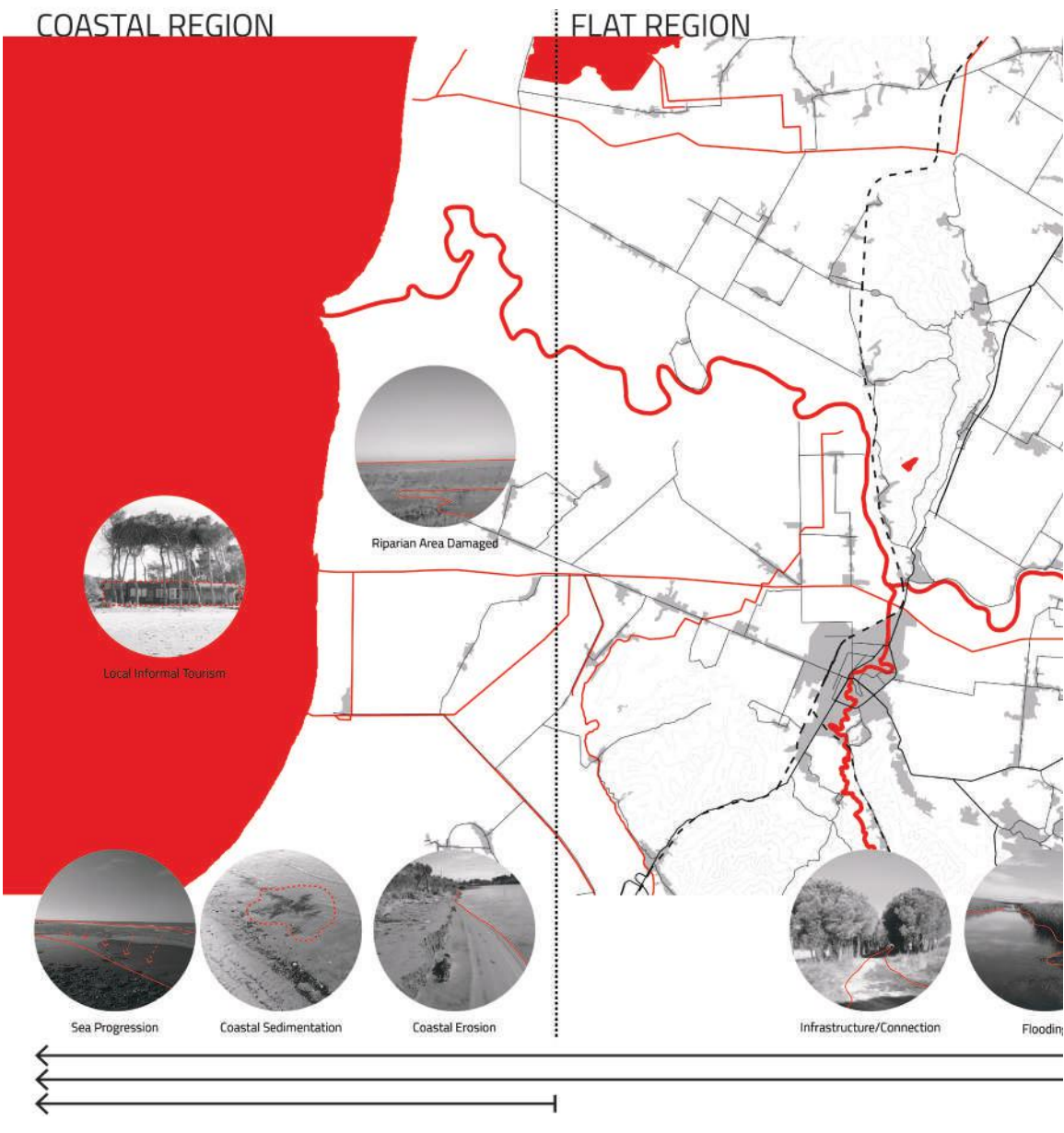
Territory knowledge / site visit and data collection

The site visit started on the Seman beach and retraced the river path until the starting point, close to Kucova, where the rivers of Devoll and Osumi meet.
The first step consisted in identifying the main problems and mapping them. Figure 7a shows the map with the problematic/ degraded areas.

Starting from the beginning of the river path in the hills, the main identified problems are:
- Deforestation / natural forests are often destroyed and substituted by farming activities and oil drills;
- Shelves erosion / the artificial shelves are not always correctly managed or properly implemented, so they collapse;
- Fragmentation of land property / as a consequence of market liberalization, proprieties have been chaotically divided which resulted in the creation of small and too many properties in a little area;
- Pollution created by factories / the huge presence of a production factory that does not follow a sustainable protocol strongly affects the air, soil and water quality;
- Farming pollution / the use of fertilizers and pesticides affects the air, soil and water quality, especially in rural areas;
- Oil-drill pollution / the oil-drill activity strongly affects the environmental quality due to the old technologies used and incorrect management;
- Floods / heavy rains, low - natural or artificial river banks and absence of an adequate riparian zone cause seasonal floods;
- Settlement pollution / the unorganized and informal settlements are responsible for the wrong development of the entire area. This includes waste production and sewage treatment which are not properly managed and cause pollution.

The central area, the flat region of the basin, mainly hosts human activities and strongly affects the river path not only in terms of pollution but also shape. The most important issues identified are:
- Settlement health risk / people are constantly in contact with stagnant drainage water and waste, since they are close to housing areas. This is dangerous for human and animal health;
- Infrastructure connection with river / the condition of infrastructures makes reaching the river stream difficult;
- Oil-drill activity / oil-drilling activities have an important impact on surrounding areas, soil, water and air. In addition, oil-drilling damages the landscape and its natural and aesthetic features.
- Drains management / vegetation rubbles and wood pieces, plastic waste and damaged banks are visible problems that affect the drain system;
- Waste management / complete absence of waste-collection systems and policies;
- Land fragility / due to all the previous

Fig5 / Site visit pictures
source / PhD international workshop students


COASTAL REGION
FLAT REGION
Riparian Area Damaged
Local Informal Tourism
Sea Progression
Coastal Sedimentation
Coastal Erosion
Infrastructure/Connection

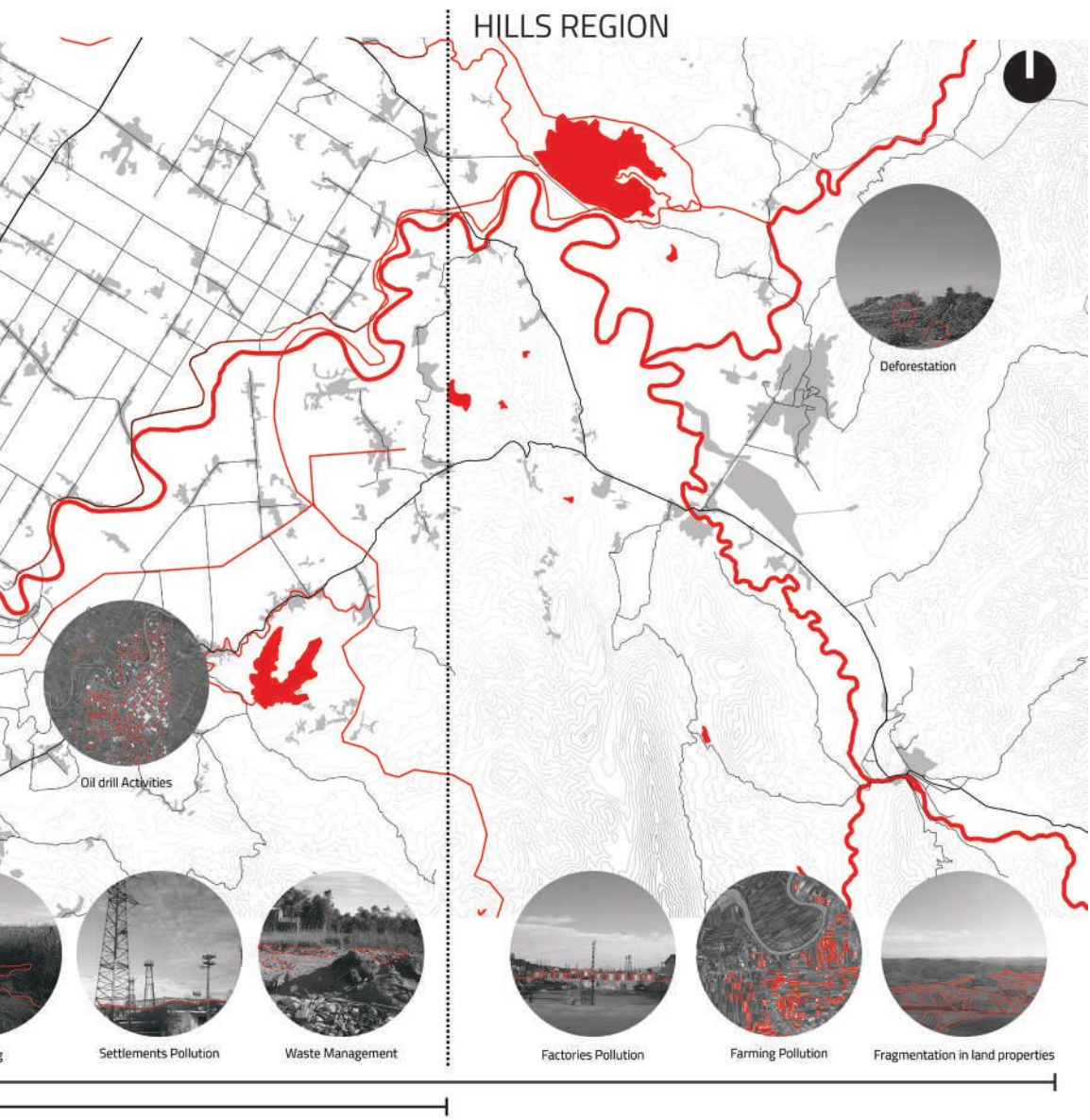
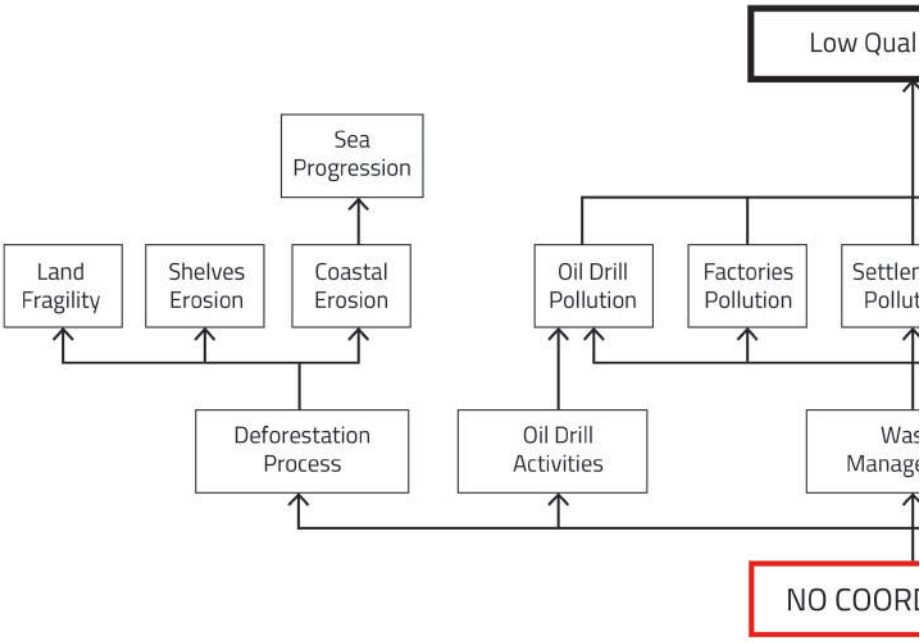


Fig6 / Geolocalization of the main problems identified in the site field source / PhD international workshop students



problems, natural and geological characteristics are strongly modified and they can cause landslides.

The coastal area has specific issues related to the presence of the sea:
- Cost erosion and deposition, sea progression / the sea line constantly changes due to the loss of the river banks, with the sea that constantly steals land to the branch extension . Those phenomena need to be contextualized in a bigger frame of sea-related issues.
- Incorrect Riparian area management / the total or partial absence of vegetation along the last part of the river allows any kind of deposit to reach the sea;
- Local tourism / in pine forests there are many informal shelters/houses used in the summer period by informal touristic activities such as restaurants or temporary accommodations.

After having identified the main problems, the following step was to classify them and clarify their hierarchy. The problems have been divided into three main categories, based on their origins: water and natural features; human settlements and connected actions; human productive processes. Figures 8 and 9 show those considerations in a diagrammatic way. The circle diagrams demonstrate that the main issues of the Seman basin area is the low-quality pollution, a result of all three categories. The tree problem shows that the main issue is the absolute absence of coordination between thematic policies: environmental, land propriety/use and production. It also allows the identification of five important problems to address: the deforestation process, oil-drilling activity, waste management, fragmentation in land property and local informal tourism.

Overall strategy / balancing the transformation factors

The overall strategy aims to define a sustainable development approach to the territory based on the rebalance of natural, socio-cultural and economic factors.
Those elements differently affect the river path and influence the entire territory.

The methodological approach consists in identifying three main systems:

Natural Water / the system identified in the entire path of the Seman River. This is a sequence of natural landscapes requiring urgent preservation actions.
Anthropic Water / the area related to the human activities: the artificial drain which goes through Patos-Marinza, the Gjanicë tributary that flows from Belsh's oil refinery to Fier, the agricultural area and settlements of the drain from Fier to the Adriatic-Ionian Sea.
Interactive Water / the area where the river flows into the Adriatic-Ionian sea, bringing with it human and natural features inherited by the previous steps.

The strategy finds its application in two ways: territorial actions and tool kits. The territorial actions attempt to provide an answer to the different issues according to their localization. The tool kits answer to the five main problems identified by the tree problems in a more punctual way.

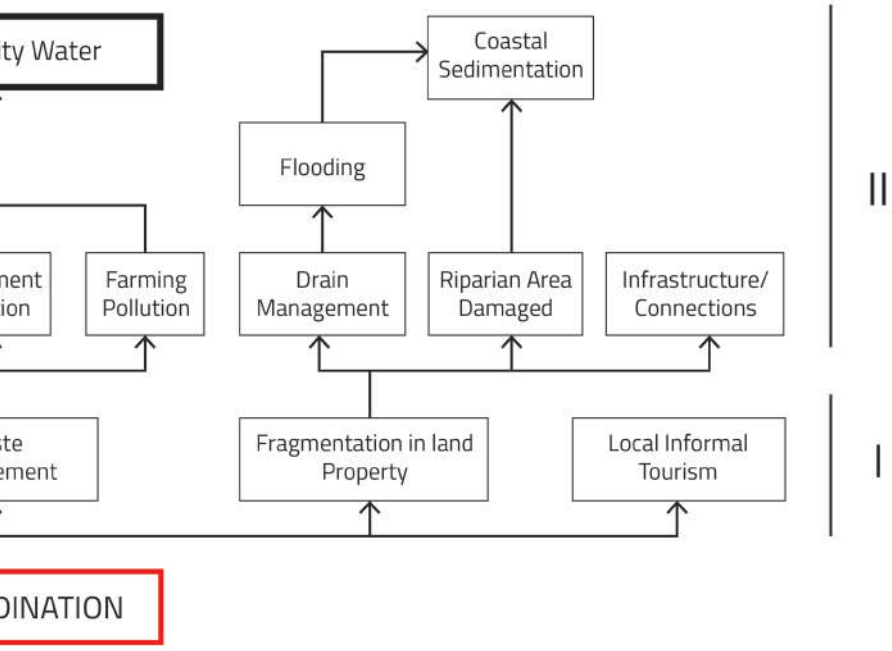


Fig7 / Seman basin problems tree
source / PhD international workshop students

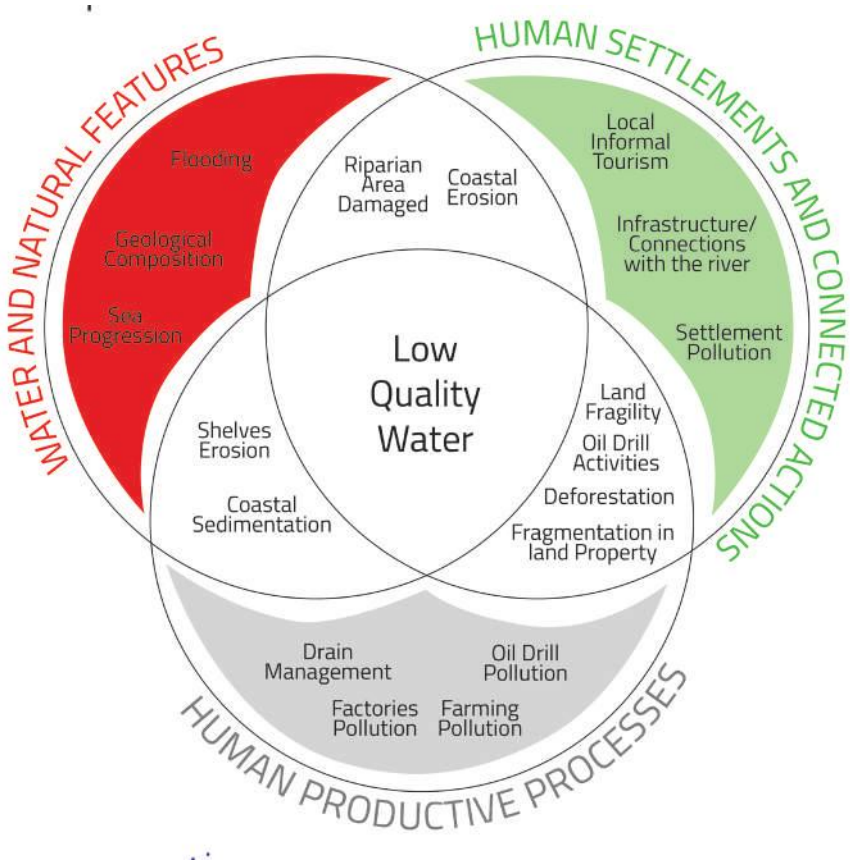


Fig8 / Circle diagrams for classifieng the main problems causes
source / PhD international workshop students

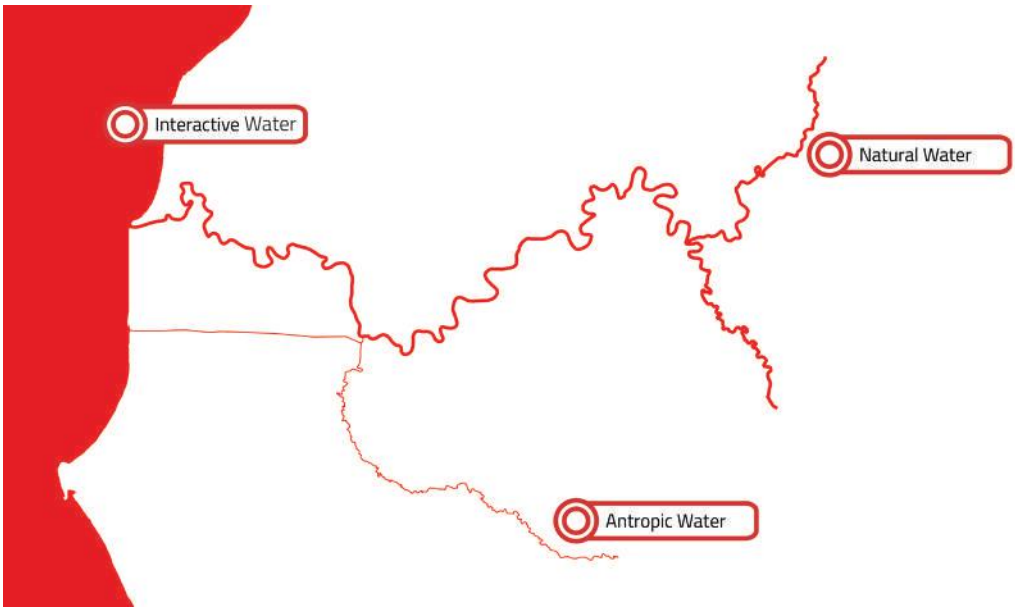


Fig9a / Diagrams explaining the strategic approach source / PhD international workshop students

Strategic actions / territorial interventions

The strategic actions try to give an answer to the different issues, categorizing them through localization. Action 1 works along the entire river at a territorial scale. The sub-actions proposed are related to the redefinition of river paths and the re-naturalization of the Seman River, land fragmentation and bioremediation areas. Action 2 works on the urban areas, dealing with human presence and effects on the territory. Action 3 is mainly focused on the coastal area, in terms of nature protection and preservation.

Action 1 / when the nature meets the water

This action works along the entire river path and it tries to give a general answer to the environmental issue through a re-naturalization process, anti-fragmentation land policies and bioremediation.

The re-naturalization process starts with the reforestation of the river bank erosion, caused by mountain dams, and continues with the river bank reconstruction and management. The main goal is to realize efficient riparian areas along all the river path in order to restore the natural landscape. In the flat region, before the oil drilling area of Patos-Marinza and the urban settlement of Fier, a series of abandoned existing caves and agricultural areas are allocated as detention basins in order to prevent the risks of flooding.

The anti-fragmentation process acts homogeneously on the territory trying to solve a problem that also exists in other areas of the country. Property fragmentation is reduced thanks to the coordination of the owners lowering the number of the existing drains and managing the remaining ones.

In order to decrease the pollution of Seman in the Patos-Marinza oil-drilling area it is realised a phytoremediation system as natural technology able to purify the soil.

Action 2 / when the man meets the water

This action is strictly related to the human presence on the territory, both in terms of pollution caused by industries and human settlements.

Punctual interventions aim to solve localized problems. An example is the Gjanicë area. The Gjanicë oil pollution is solved through the importation of water treatment plants close to Belsh's oil refinery.

The re-use of abandoned structures aims to provide services that are otherwise absent. The disused nitrate factory of Fier is transformed into a sewage treatment system for all the area settlements. This intervention allows the renovation of an existing abandoned heritage, reconverting it both in functions and use.

In order to make the agricultural lands more productive, the solution is to reduce property fragmentation through farming coordination and cooperation so as to achieve a more efficient drainage management. The connection between the existing roads and the new public services like waste and sewage collection systems allow the reduction of sprawl by increasing the existing settlements down the main roads.

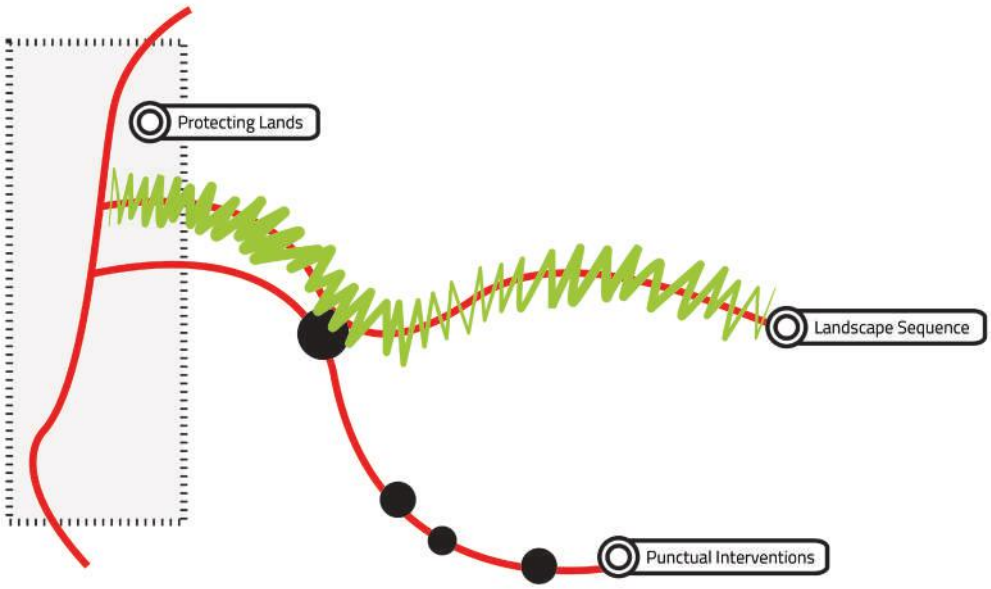


Fig9b / Diagrams explaining the strategic approach source / PhD international workshop students

Action 3 / when a river flows into the sea

When the river flows into the sea, it transports all its problems to the open sea, adding their effects to an already dangerous situation in terms of world environmental issues such as coast line transformation, for instance.

The institution of a protected area represents the first step towards starting a sequence of preservation interventions and valorisations actions. The adjacent existing protected natural area of the Karavasta Lagoon is enlarged in order to create an ecologic corridor that connects the regional heritage. This area includes the natural heritage as far as the Apollonia archaeological park and industrial archaeology spread around the territory.
The coast erosion, sedimentation and sea progression are solved through sand dunes management, wooden sea walls and reforestation of the existing pine forests with proper tree species. In particular, the river mouth riparian area will be refurbished. The coastline consolidation is as much of a fundamental phase for ensuring a future to for the coastal region as the reforestation process.

Tool kits / punctual interventions

These actions are implemented through precise tool kits, which at the same time act on the five main issues identified as main causes in the problem tree (see above). Those are instruments of intervention in terms of policies and physic actions. Possible financing sources have been hypothesized for each one.

Tool kit 1 / Deforestation

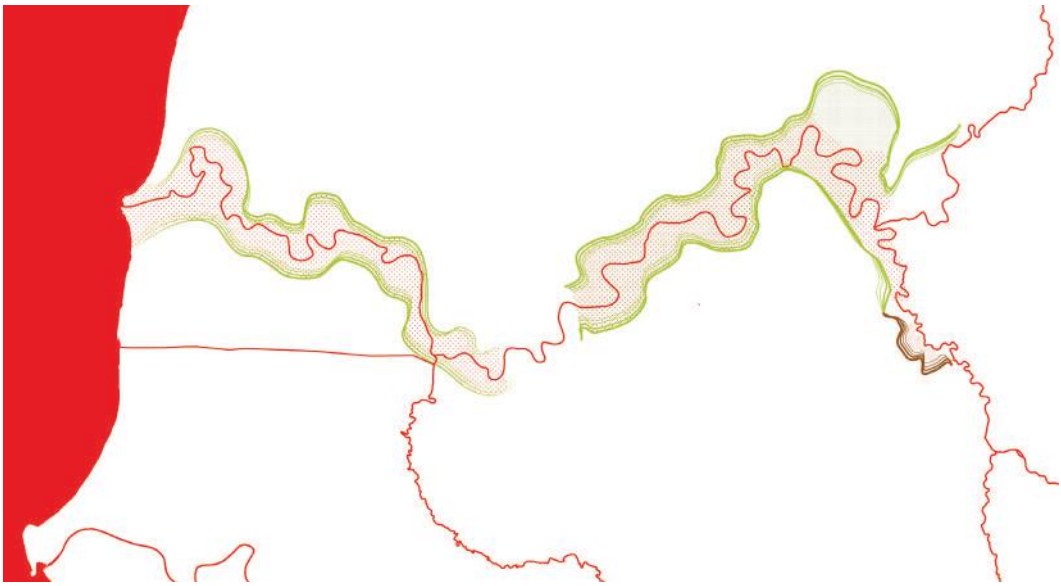
The first action needed is the regeneration of the riverbanks with the creation of detention basins, starting with the planting of new trees in protected areas.
How can that be done?
Capacity Building / The Governance starts to teach the inhabitants, with the help of education authorities, how to use the detention basins (what and how to plant there).
Financing / Ministry of economy can lead the financing derived from the Oil Industry sector to river regeneration (soil management for the creation of riverbanks, planting trees).

Tool kit 2 / Oil drill activities

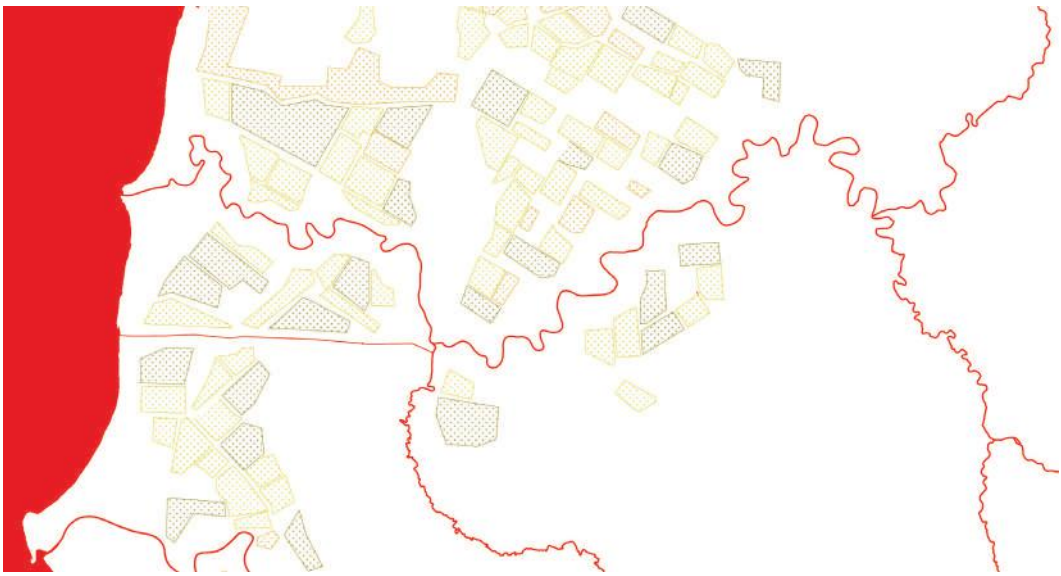
In order to avoid land consumption in the oil-extraction areas, equipment and oil tanks should be placed in denser sites, away from the river, in order to create an area of phyto-purification in the vacant areas.
How can that be done?
Regulation Codes / The Government should provide regulation on oil-drill extraction areas in order to create exclusive areas for better managing and improving health security.
Capacity Building / Creation of a Specific Agency for Oil Extraction Areas that will monitor the public health impact on the surrounding municipal areas.

Tool kit 3 / Waste Management

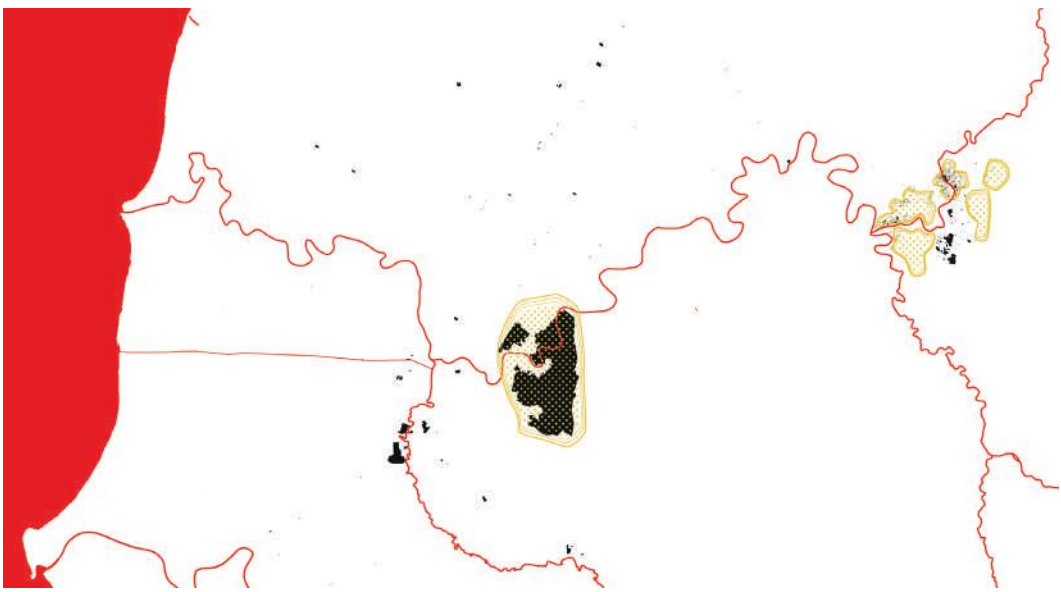
In order to avoid the extreme pollution of the river, the Municipality has to implement different kind of actions: the creation of waste factory treatment plants and solid



Action 1.1 / re-naturalization

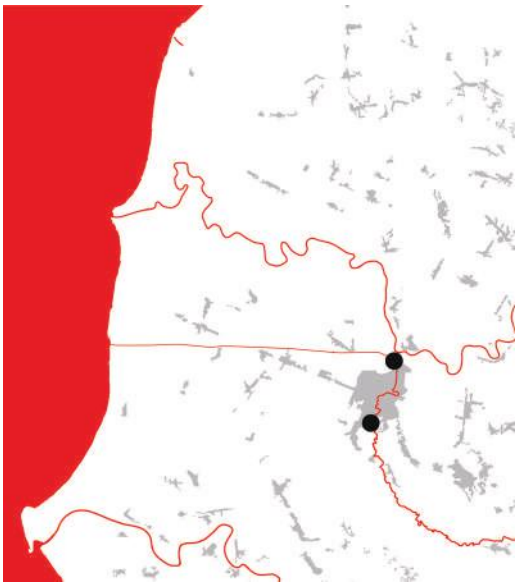


Action1.2 / anti-fragmentation

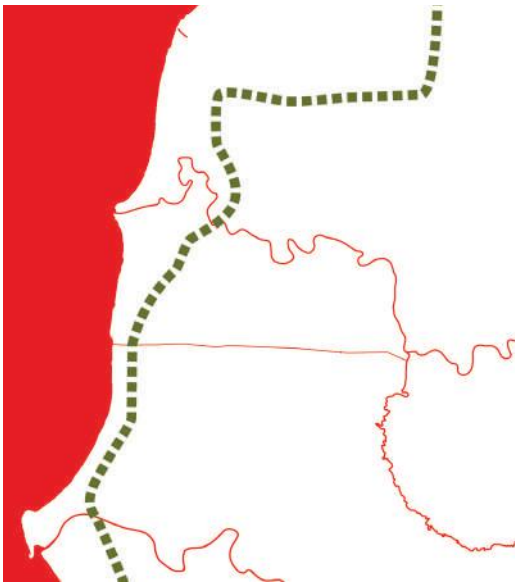


Action1.3 / bioremediation

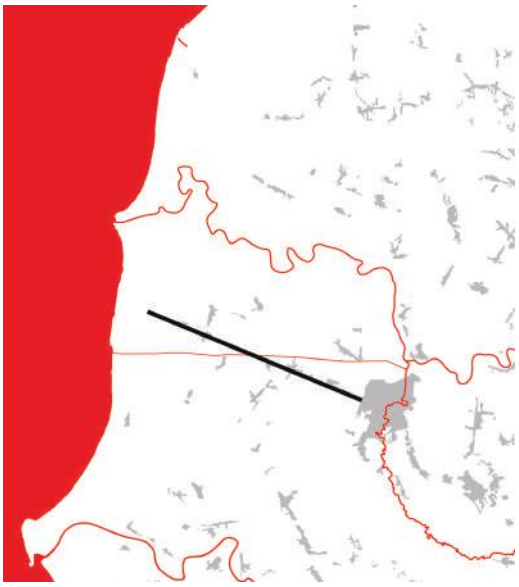
Fig10a / Diagrams for Action 1
source / PhD international workshop students



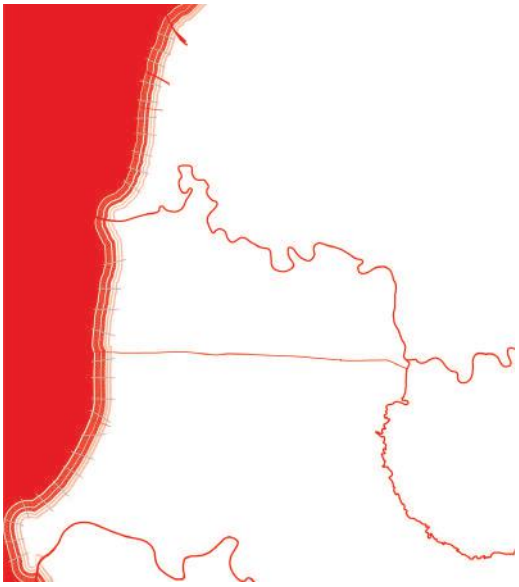
Action 2.1 / puctual depuration



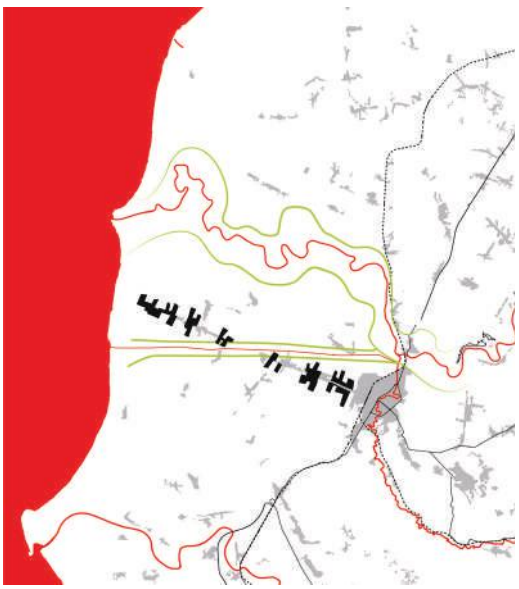
Action 3.1 / park institution



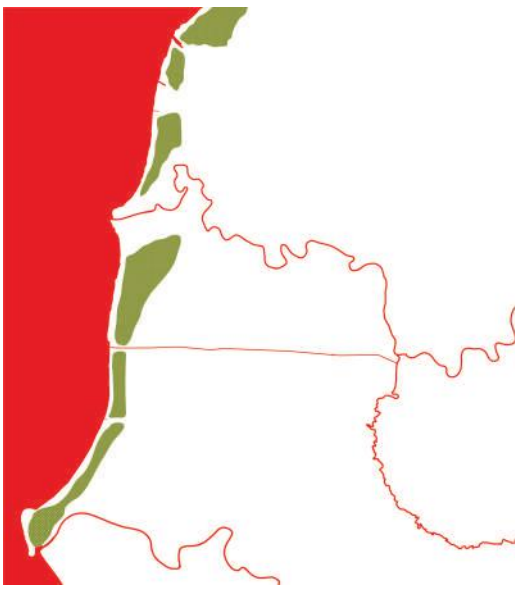
Action 2.2 / sewage collector



Action 3.2 / coastline consolidation



Action 2.3 / urban consolidation



Action 3.3 / reforestation process

Fig10b / Diagrams for Actions 2 and 3
source / PhD international workshop students

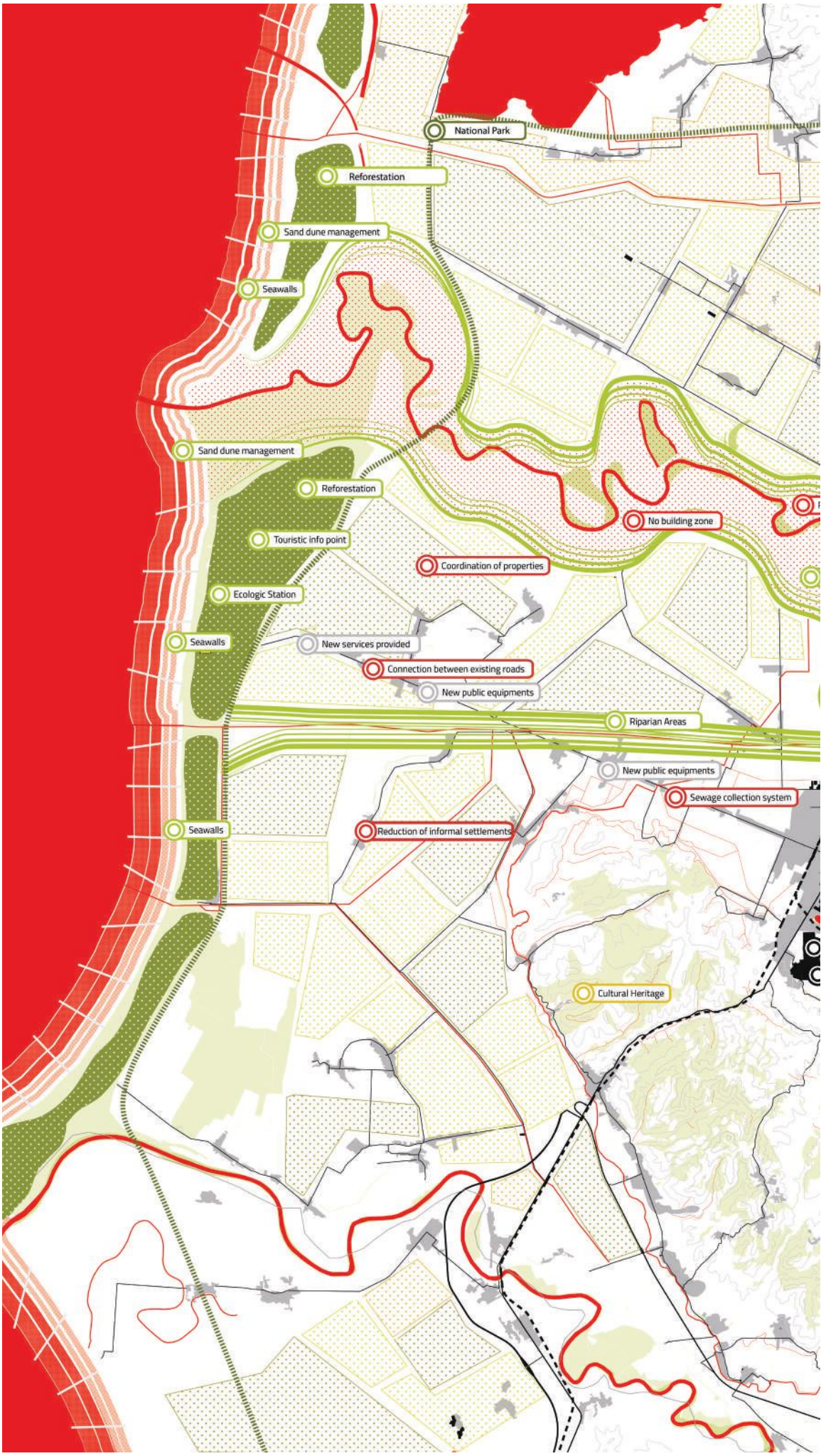
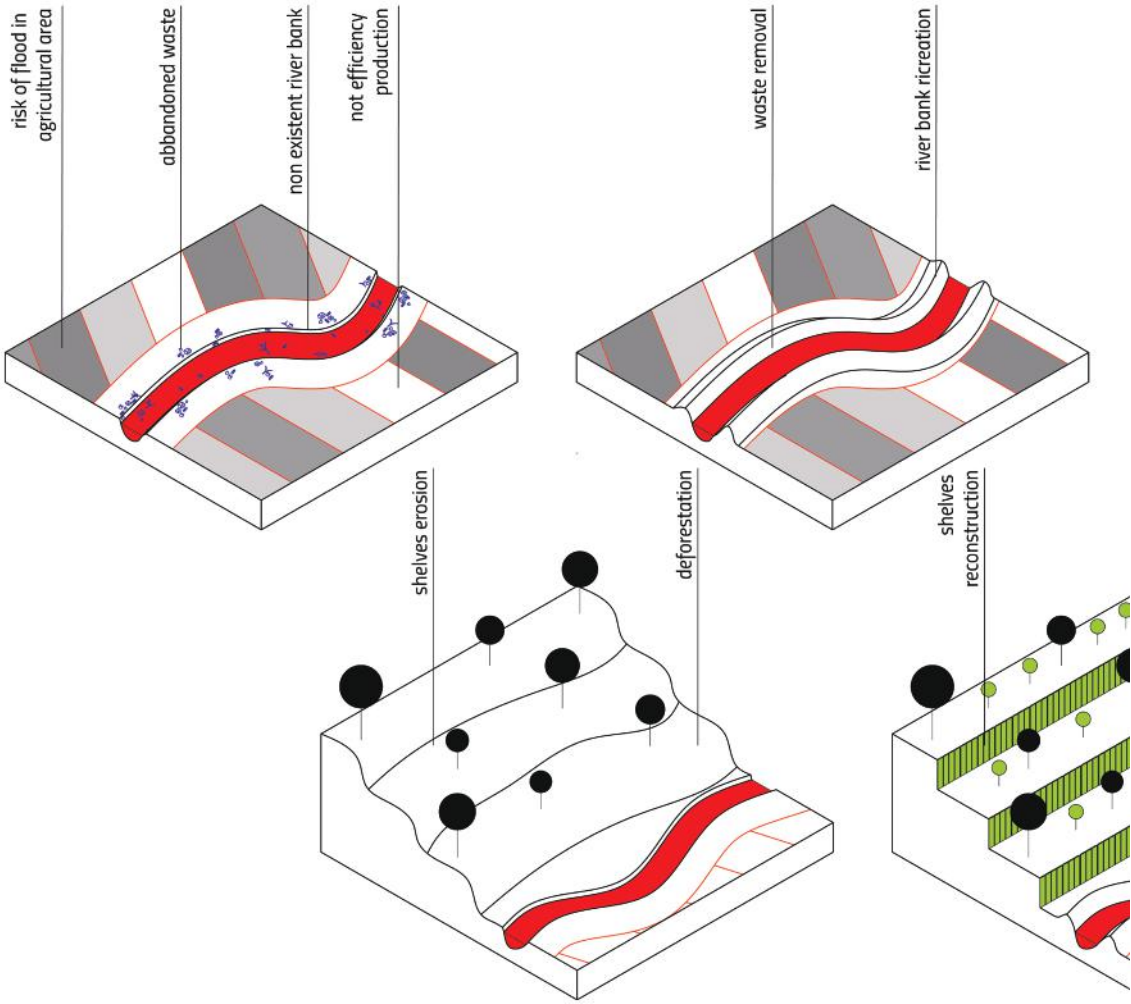

National Park
Reforestation
Sand dune management
Seawalls
Sand dune management
Reforestation
No building zone
Touristic info point
Coordination of properties
Ecologic Station
Seawalls
New services provided
Connection between existing roads
New public equipments
Riparian Areas
New public equipments
Sewage collection system
Seawalls
Reduction of informal settlements
Cultural Heritage

Fig11 / Masterplan
source / PhD international workshop students



waste collection areas. Regarding the river, the most important action is the reforestation and cleaning of the path.

How can that be done?
Financing / The Municipality supervises and funds the waste bins of separate collection for all kinds of uses.
Partnership / With private stakeholders for waste management in order to create a center of depuration and recycling.
Incentives / Push the recycling of waste in the single neighborhoods by proclaiming higher taxes for the ones who do not follow the policies.
Capacity Building / Creation of educational campaign for waste collection, in partnership with schools.

Tool kit 4 / Fragmentation in land property

The extreme fragmentation leads production to be local and not developed. The creation of an agricultural consortium will lead that market to a more competitive development. This will be done by keeping and renewing some of the existing canals. Meanwhile, with the changing of scale of this kind of market, some free areas can be converted into detention basins to prevent the flooding outside boundaries and erosion in non-monitored areas.

How can that be done?
Capacity Building / At a Municipal level a solution is needed for a consortium development in order to make a common issue of land use.
Regulation Codes / The Government should provide internationally approved certification for agriculture goods (technology) and products.

Tool kit 5 / Local Informal Tourism

This action will be developed on the whole coastline. In order to avoid costal erosion positioning seawalls and a better organization of dune management are needed. It is necessary to remove the informal touristic structures and to create an authorized Touristic Info Point. Reforestation will be coupled with the enlargement of the Natural Park in the southern area. Another important thing is the reconnection of the sea area to the Heritage Sites of the region, providing accessible transportation systems.

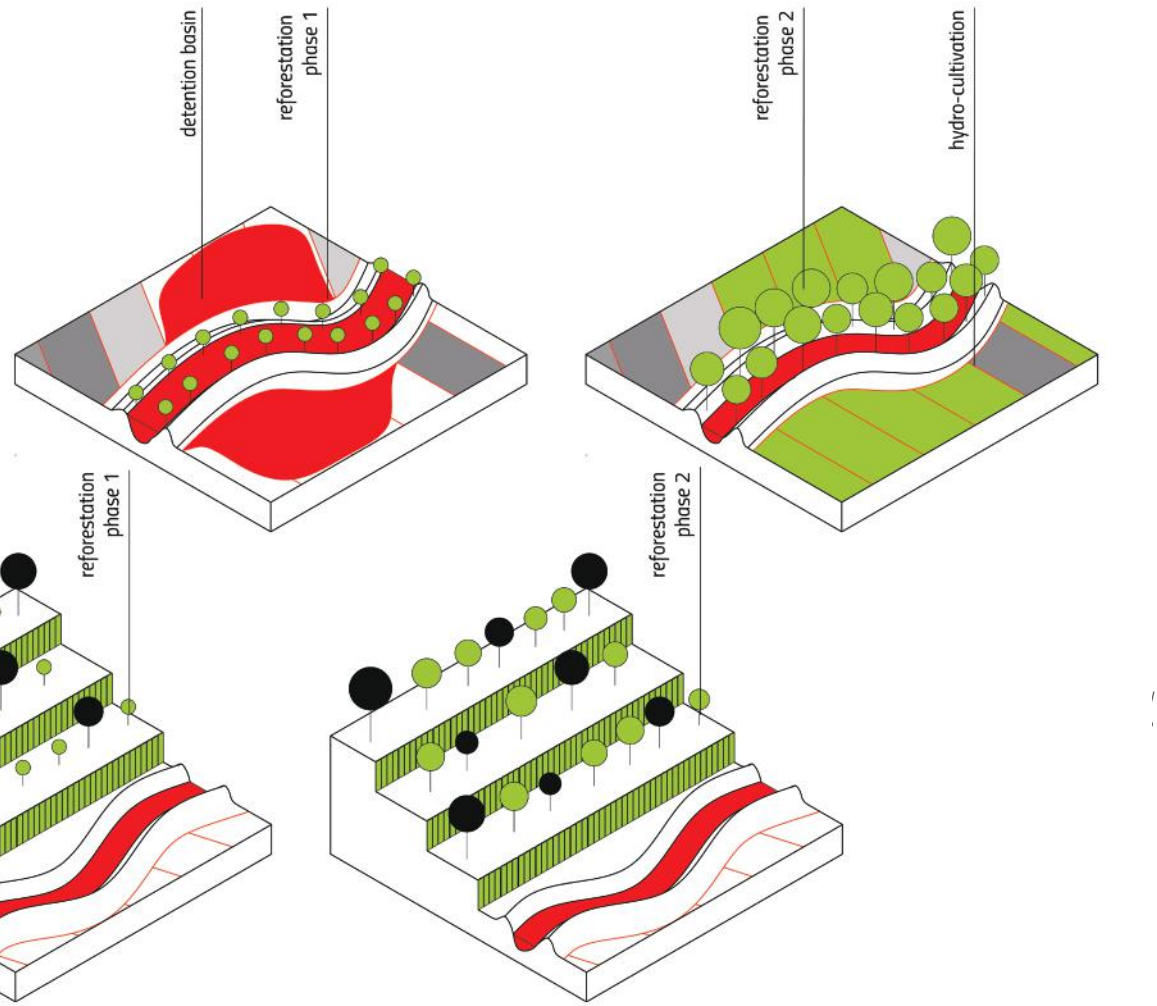


Fig12a / Deforestation Tool kits
source / PhD international workshop students

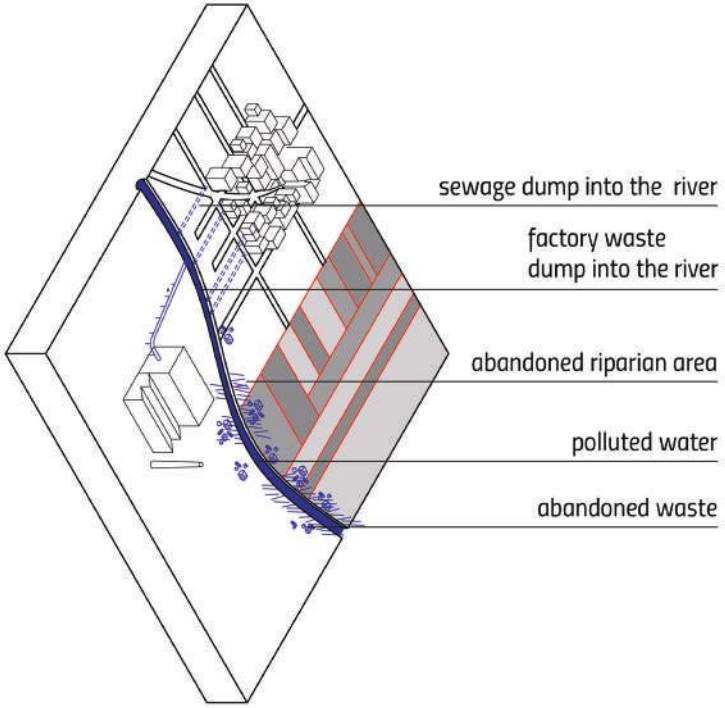
How can that be done?
Regulation Codes / The Government and Municipality will provide exceptional authorizations for those who want to invest in the touristic sector and force out spontaneous investment. Touristic investment should provide info points, sea watch guards, naturalistic and heritage tours.

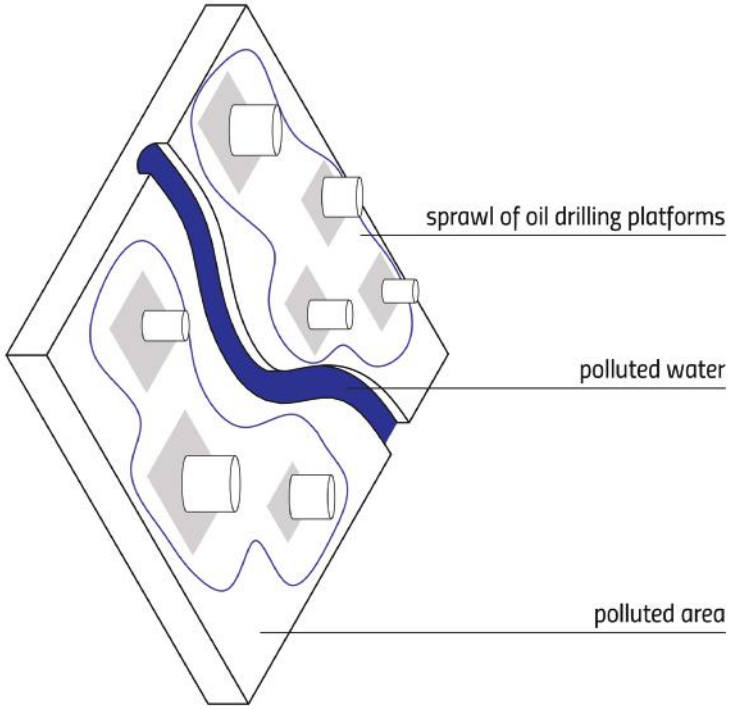
Conclusions

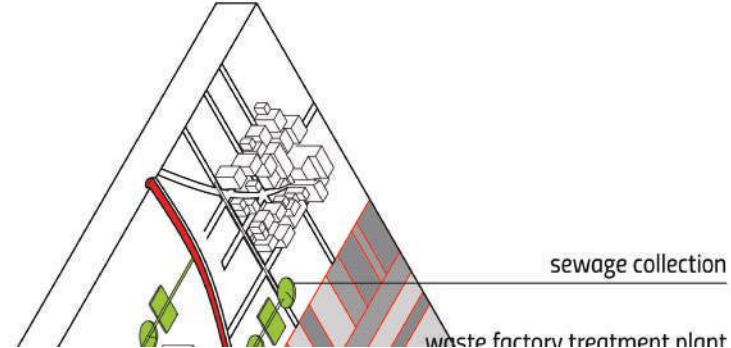
From a methodological point of view, the workshop experience emphasizes the necessity of a multidisciplinary approach in developing territorial strategies. The presence of urban planners, biologists and architects allows the joining of different knowledge fields and the analyses of the same issues from different points of view.

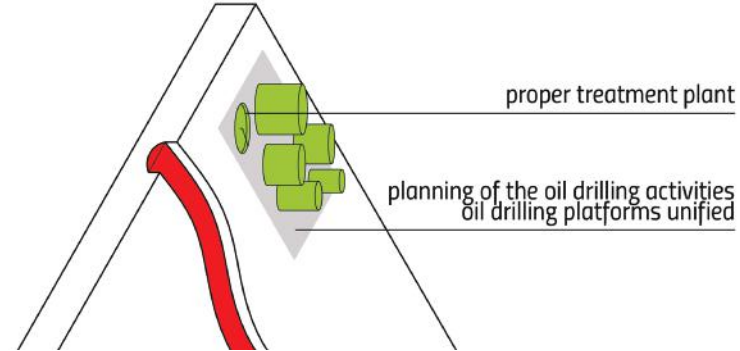
The strategy proposed finds a direct link to all the four pillars of the European strategies of the Adriatic and Ionian Macro-Region. The Environmental Quality issue is a constant in all the actions and tool kits designed, while the other pillars are more related to specific actions. For example the Region Connection is a theme of Action 2, while Blue Growth and Sustainable Tourism are more evident in Action 3.

The workshop results are strategic actions that need to be further developed. The PhD students' contributions in this chapter deal with some of the previous themes and try to answer them in a more specific way, according to their personal research fields and knowledge.


sewage dump into the river
factory waste
dump into the river
abandoned riparian area
polluted water
abandoned waste


sprawl of oil drilling platforms
polluted water
polluted area


sewage collection
waste factory treatment plant


proper treatment plant
planning of the oil drilling activities
oil drilling platforms unified

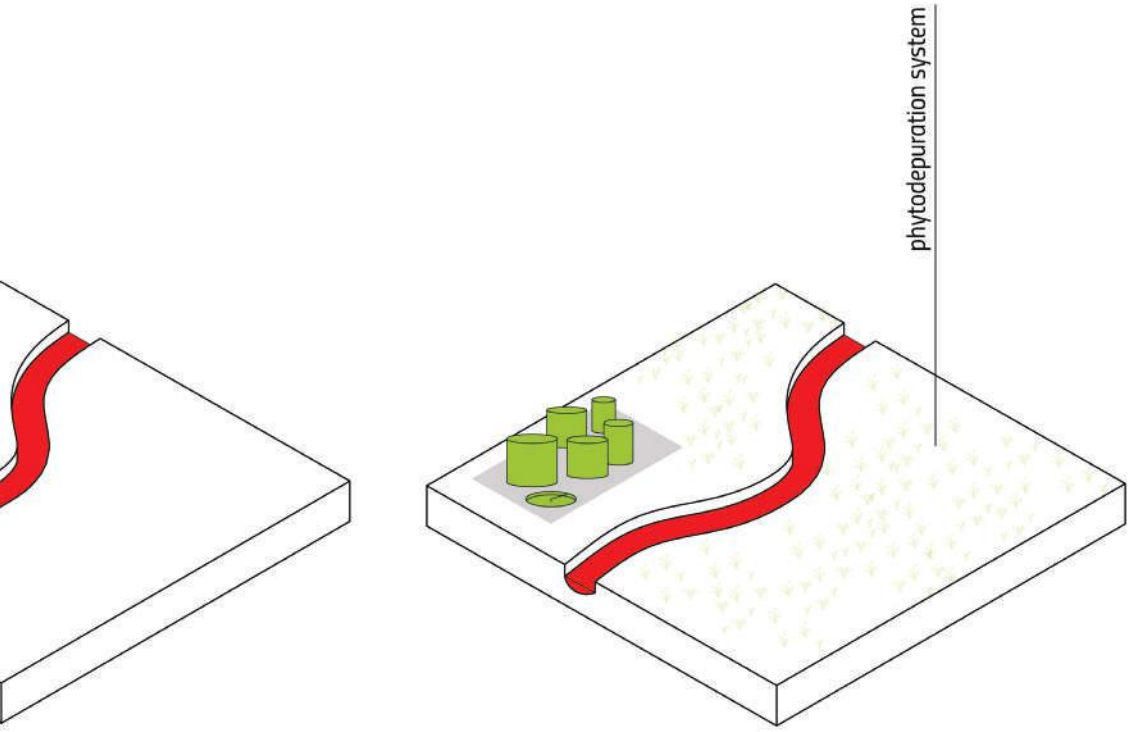


Fig12b / Oil drilling system Tool kits
source / PhD international workshop students

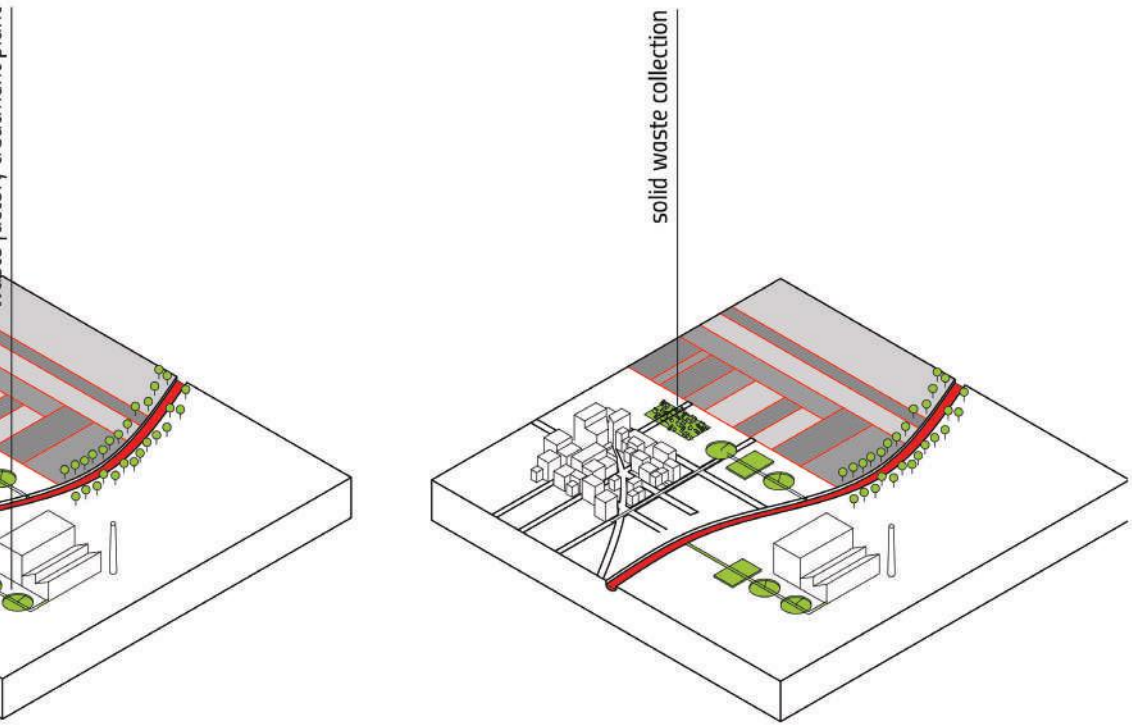
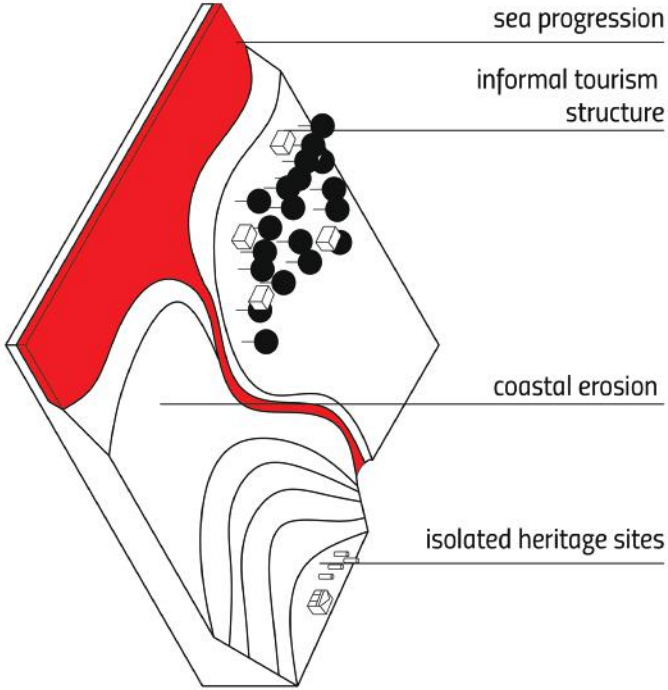
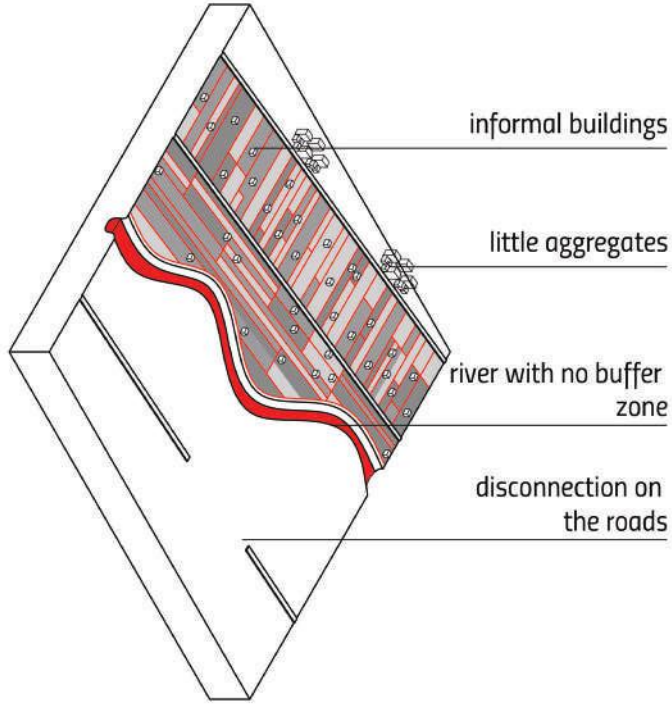
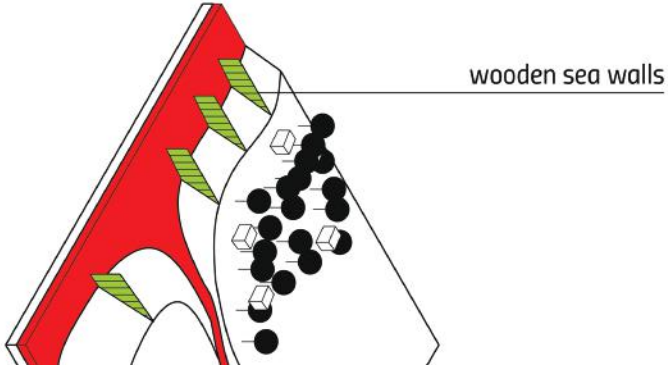


Fig12c / Waste management Tool kits
source / PhD international workshop students


sea progression
informal tourism structure
coastal erosion
isolated heritage sites


informal buildings
little aggregates
river with no buffer zone
disconnection on the roads


wooden sea walls

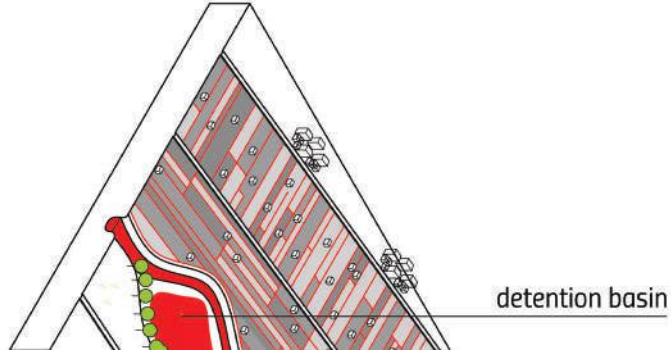

detention basin

Fig12d / Anti-fragmentation Tool kits
source / PhD international workshop students

Fig12e / Seman National Reserve Tool kits
source / PhD international workshop students

Restoration and protection of ecosystem in the Seman delta / Strategies for the requalification of the Coast

keywords / erosion, sea progression, tourism, coastal ecosystem, pollution

Maria Teresa Camerada
PhD researcher / Ferrara University

Abstract

This paper analyzes the impact of natural and human factors on the erosion of Albanian beaches and proposes several strategies for the restoration and recovery of coasts. The widespread phenomenon of erosion on beaches is a natural process caused by the action of wind, tides or storm surges, but also the increase of the sea level resulting from global warming. The coastal erosion can be accentuated or accelerated by human activities, such as land use for agriculture and industry, urbanization, tourism development processes, pollution. The result is the alteration of morphological characteristics of the shoreline and risk of biodiversity loss as well of landscape identity. The aim of the strategies adopted to restore the dune system is the reconstruction of dunes by planting native vegetation, the establishment of fences and barriers, the use of cages and, in extreme cases, the import of compatible graded sand from other areas. Finally, development of sustainable tourism in harmony with recovery strategies and restoration of ecosystems must be encouraged as well as awareness-raising campaigns about environmental issues, promoting the active involvement of the local population.

The principal causes of the transformations and alteration of coastal areas are to be allocated to natural phenomena which include the widespread phenomenon of coastal erosion and the world increase of the sea level, but also human activities like urbanization, wild building construction, waste and pollution, processes of tourism development (fig 1). The recovery and requalification of environmentally degraded areas provide planning and management strategies related to landscape resources (Calcagno, 2012). The Rio de Janeiro Conference (1992) and agreements arising therefrom have broadened the environmental protection concept, which until then were almost exclusively used to denote the conservation of habitats and species, including sustainable development. An eco-sustainable development is based on the equilibrium between environmental quality, economic activity and the needs of society, able to preserve ecosystems for the future by encouraging actions that conserve what exists and restore what was damaged or lost (Diefenderfer and Thom, 2003).

Methods

This research required a preliminary study in order to know the area of interest and identify the different problems. The process of territorial knowledge started during the site survey, documented by photographs. This paper considers the Albanian coast overlooking the Adriatic sea, in particular the area that extends along the Seman Delta (fig 2), defined as a zones of transition which includes water marine and tidal freshwater marshes (fig 3). The lagoon system of the Karavasta-Divjaka National Park along with the Shkumbin and Seman rivers, their outlets,

Fig 1 / State of neglect of the beaches during the winter period source / Maria Teresa Camerada

the Terbufi Myzeqe and drainage channels, have an ecological economic importance, constituting one of the most complicated and dynamic hydrological systems in Albania.

The area is near the archaeological site of Apollonia, which was founded in 588 BC by ancient civilization from Corfu and Corinth Island and which reached its maximum development during the Roman period. The ancient road called Via Egnatia remains as evidence of its existence. It was built by the Romans in the 2nd century BC to connect the Roman provinces of Illyricum, Macedonia and Thrace, the territory that is nowadays part of modern Albania, to Thrace (Turkey). The town of Apollonia bears other testimonies of the past, for example the Saint Mary church and monastery (13th century), where the remains found in the archaeological park are exhibited. The erosion of the Albanian coasts is attributed to natural phenomena such as an increase in the sea level due to global warming and the reduction of solid materials compared to the reservoir of sediment formed during the last glaciation of Würm (Balla and Bulliqi, 2014), as well as to human factors which intensify this process. In fact, the construction of hotels, holiday homes, car parks, beach facilities and faulty waste management produce negative impacts, while the erection of dams and harbors, as well as the deviation of the river in artificial canals, has reduced the sediment supply for beaches with a loss of an average of 50 metres for year. Following the flooding that occurred between 1962 and 1963, the mouth of the Seman river was shifted by 13 Km South. This shift has caused an intense and continuous erosion of the delta because of the cessation of the intake of sediments, a phenomenon increased by human activities in the upper basin in the floodplains, as agricultural development, the chemical plants, oil and gas fields, oil refinery, etc.

The morphology of the Albanian territory is a result of tectonic activity that has included diverse set of soils of different ages and origins. In particular, the soil in this region is mainly composed of Quaternary sand and clay sediments, affecting the topography, the river network and therefore the erosive and depositional phases. The corrugation of the coastal region is accompanied by considerable vertical movements and consequent appearance of numerous failles, some of which are inclined and thrust modest. In this way cliffs are formed and in correspondence with tectonic depressions some deep bays, in which ancient marine deposits, beaches and dunes, in addition to being preserved and accumulated, are also modeled; all those formations are subject to possible erosion and landslides (Magnani, 1946). In some areas the sea has advanced inland swallowing beaches, forest and agricultural land, altering wetlands and lagoon ecosystems and creating damages for touristic investments, contributing to the elimination of dunes and vegetation. Generally the beach is formed when the quantity of sedimentary material available on a coast is larger than what the sea can take away (Balla and Bulliqi, 2014).

Fig2 / Delta of Seman River
source / Vezir Muharremaj

Fig3 / Tidal freshwater marshes near the coast source / Maria Teresa Camerada

The materials are redistributed by the alternation of storm with calm sea, swift erosion during storms and a gradual return to the beach of the eroded material during quiet periods. The beneficial functions of coastal dunes emerge in their ability to provide a reservoir that nourishes eroding beaches, acting as a barrier to storm surges and flooding, limiting storm wave effects on landward coastal deposits (O'Connell, 2008). In fact, the natural dunal areas are buffer zones able to reduce the impact of fluctuations and sea erosion. As it was observed during the Seman delta survey, the severe erosion has left the pine forest exposed to strong winds, salt spray and other adverse environmental conditions (fig 4).

The beach erosion is often associated with the subsequent demolition of the dunes behind. So there is an alteration of the sequence of coastal habitats, lacking the entire first portion of the chain of habitats. In this way, the vegetation stabilized on the dunes comes to be in direct contact with the sea, with no protection from wind, salt, etc. Generally the vegetation communities may be different in three zones: Pioneer, Woodland/Scrub and Forest/Heath zones. Pioneer plants, present from the debris line on the beach to the crest of the frontal dune, constitute the initial vegetation which colonizes newly developing sand accumulations and prepares the soil and other habitat conditions for the establishment of secondary stabilizers. The Woodland Zones usually covers the crest of the frontal dune and may extend further inland to include the secondary dune. The function of this zone is to stabilize the accumulated sand and generally improve soil conditions to enable a wider range of plant species to establish later. Finally, the heath or forest areas are located usually landward of woodland areas and represent the mature state of the development of coastal vegetation. The main function of the forest areas is to stabilize hind dunes areas by holding the sand in place, providing a habitat for flora and fauna and an important transition zone between the sea and the inland areas. The vegetation significantly influences the size and stability of the dune areas, because the system's long and deep roots allow to minimize the loss of sand due to wave action. While, height and density of native dunal species provide an effective buffer, minimizing wind effects and managing to intercept wind-borne nutrients from the sea. Furthermore, native dunal vegetation provides a habitat and corridors for local and migratory fauna species. To restore an ecosystem means restoring its lost functions by natural engineering solutions, promotion of good landscape design and thus the policy should be educational and promotional. The natural dune rebuilding process can take several years. Also local experiences prove that this process can be facilitated by the installation of the sand fence and the planting of vegetation. In extreme cases otherwise it is necessary to import sand of compatible grain size to build the dune (O'Connel, 2008) At first the sand fending should be installed landward, far from the sea, so as not to suffer the loss of sand during storms and floods. The sand fences are made of different materials,

Fig4 / Effects of wind and salt air on the pine forest source / Maria Teresa Camerada

including wood, plastic, polyethylene, and metal. The rebuilding of the dunes is done by using sand fencing to capture wind-blown sand but also it is critical that the area be stabilized with pioneer plants to start the redevelopment process of the vegetation zones. Moreover, it should impose the ban on taking inert materials from river-beds and on the coastline (Balla and Bulliqi, 2014). The pioneer species used such as sea rocket maritime (*Cakile maritima*), prickly saltwort (*Salsola kali L.*), are gradually replaced by the typical dune vegetation (fig 5) dominated mostly by sand couch grass (*Agropyron junceum*), and rarely by beach grass (*Ammophila arenaria*).

The dunes *Elymus farctus* colonized are consolidated by *Ammophila arenaria*, The tufts over a meter long and extensive root system of this *Graminaceae* form a wind-blown sand barrier which is deposited between the drums increasing the height of the dune stems Leaves grow in turn and it is set in a dynamic balance between accumulation of sand, wind erosion and growth of *Ammophila arenaria*. The vegetation must be planted with care, covering up almost completely, so that the plant accesses moisture more easily and is protected from wind and trampling. The forest is composed of pine species *Pinus Halepensis* and *Pinus pinea*, which are mixed with deciduous trees, in particular common alder (*Alnus glutinisa*), common oak (*Quercus robur*), white poplar (*Populus alba*), in particolar common elm (*Ulmus minor*). The shrubs are represented by typical Mediterranean species, which, occasionally, form very dense bushes. The most common species of shrubs are: common myrtle (*Myrtus communis*), mastic tree (*Pistacia lentiscus*) and prickly juniper (*Juniperus oxycedrus*). Among the possible interventions put in place on Albanian beaches for erosion control and reduction of the loss rate of materials is the use of groins and seawalls. These structures, usually made of rocks or wood, are usually perpendicular to the shore and extend from a point landward of possible shoreline recession into the water at a sufficient distance to stabilize the shoreline. Seawalls are shore parallel structures, designed to protect upland property from coastal erosion and flooding caused by wave action and storm surges.

The seawalls are typically constructed of concrete of steel sheet piling. There are various types of windbreaks and different materials: wood or ramiglia, in jute mesh or coconut fiber, in single or double row. The use of checkerboard barriers made with reed mats on poles in chestnut, promotes the deposition of the wind sand and the consequent creation of a dune deposit. The vegetation and the favorable conditions for its development, help to increase and stabilize the deposit. With time, the fences are covered with sand, rot and disappear, leaving the dune with a natural appearance as early as the 6th-7th year. Another solution can be the use of gabions of natural materials, with a square section, filled with bundles of tied twigs and sand mixed chips, covered with sand from the excavation. The gabions have a high flexibility and adaptability to the morphological variations of the soil

Fig5 / Dune vegetation on degraded beach near the mouth of the river source / Maria Teresa Camerada

and are not visible. The erosion has a heavy economic impact; in fact the beaches are the basis of seaside tourism, just as the number of native and foreign visitors has been continuously growing, but also on the ecosystem and their equilibrium.

The two things are closely connected in that the growth of tourism has brought with it the construction of hotels, holiday homes, parking lots, roads, beach facilities and marinas, which have led to the elimination of dunes and Mediterranean vegetation (Balla and Bulliqi, 2014). In this case, it would be necessary to construct access ways for the use of vehicles and pedestrians, but also some fences to limit the trampling of bathers on the dunes. The establishment, maintenance and upgrading of access to the shoreline can be implemented through a walkway consisting of a wooden platform resting on the floor and arranged according to the morphological evolution of the existing path, adapting to the natural contours of the dune near the sandy shore, to avoid being walked (Bartoletti et al, 2010). In fact, a light footfall favors annual species that manage to germinate faster and complete their life cycle, at the expense of perennial ones that need time to develop the extensive root system that helps to stabilize the sandy substrate. Typically, in the vicinity of frequented paths by bathers, where the wind erosion potential increases the creation of preferential lines of erosion and the reduction of vegetation cover, one can form blowouts (deflation basins by removing products of sand particles by wind), with progressive destruction of the dune ridges. The size of blowouts are proportional to those of the dune cordon in which they are formed (O'Connell, 2008). The dunes and plants that grow in them have limited capacity to recover from intensive use without assistance and care from the community and the deposit. To prevent the invasion of dune ecosystems by alien species the easiest and most effective action would be the prevention of introductions, encouraging the use of the native species psammophilous for ornamental purposes and their cultivation in the nursery. Weeds and exotic species are common in dunal areas that are impacted by human activity and can be introduced through their roots and seeds in plant pots, cuttings, poorly managed compost, animal manures, wind, tides, animals, and dumping of garden wastes. This requires the removal of these unwanted plants, introduced through actions planned and controlled in time. The weeds are not removed at once, the seeds and the sections of the root system are removed, while native species appropriate for the area are replanted. Weeds and / or invasive species are removed from areas public / private property adjacent to dunal areas to prevent infestation and spread. The weed plants are eradicated by hand, while only the use of low toxic and no residue chemicals is permitted according to the law. Another problem is the management of waste. Currents, tides, winds and wave action can carry on seashore durable solid materials products by humans, along with the natural organic debris, turning the beaches into a natural storage site (fig 6).

Fig6 / Waste taken ashore from the sea source / Maria Teresa Camerada

It is necessary to be accurate in defining "waste" as, in fact, the natural organic debris that normally is along the beach and which constitutes a valuable element in the balance of these fragile systems, is perceived as waste and consequently removed altogether with normal trash. The structures built for retaining sand, as barriers, fences, reintroduced native plants, could constitute a further element of degradation if left in a state of neglect (fig 7).

As regards to the management of organic and inorganic wastes, the daily cleaning of the beaches should be performed preferably by hand, for the collection of beached material, or by mechanical small wheeled or tracked screeners, so as not to remove the sand. In fact, another very common threat is the mechanical execution of cleaning and scraping of the beach, aimed at the tourist exploitation of the beaches. In this way the morphology of the beach is altered, also causing the removal of pioneer plant communities.

Conclusions

The requalification of degraded coastal areas is possible by intervention plans and projects aimed at restoring ecosystems, using available resources in a sustainable manner. It must try to create an equilibrium between environmental quality, economic activities and society's needs, promoting the development of sustainable tourism, which considers the landscape a collective good and inheritance for future generations. The first step is the protection and recovery of dune systems by implementing targeted strategies, but also through information and awareness campaigns, actively involving local populations, and through the implementation of laws and regulations. For the timely recovery and preservation of dune and dune environments, redevelopment must be associated with good behavioral practices of those using the area or public and private entities who manage it (tourism, cleaning).
The monitoring and maintenance in continuum represent an effective control tool over time. The monitoring of an ecosystem is a complex investigation process which involves the collection of data and subsequent analysis of the recorded information. In the case of investigations that involve a long period, one can use not only the data obtained from the field observations, but also they derived from other sources, such as satellite images or series of historical aerial photographs, in cases where the objective is the reconstruction of trends of change or the creation of simulation models for the prediction of future scenarios. The landscape is a living and dynamic organism, but also a shared resource that must be preserved, valued and managed properly, by integrating it with models of sustainable development that promote the conservation and protection of ecosystems.

Fig7 / Effects of erosion on the interventions put in place to restore the dune system source / Maria Teresa Camerada

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New drivers of sustainable development in developing countries / Unlocking the energy saving potential in Albania's residential sector

keywords / energy efficiency, sustainable architecture, household energy consumption, innovation processes

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Abstract

In - and due to - the current economic and social condition, new innovation processes are happening in developing countries, 'proving that scarcity of means can stimulate technical inventiveness'. (Galiano, 2014). This is what occurs when cities and the existing demanding conditions are considered strategic and potential resources for their occupants. Albania, one of the fastest-growing countries in Europe before the global financial crisis, is making every effort to attain a competitive market economy and reach EU membership. Despite demonstrating significant economic growth in the last decade, the country's development is constrained by an insecure power supply and obsolete energy infrastructure. One of the main challenges in ensuring a reliable and sustainable power sector is represented by electricity, whose production is completely dependent on hydropower generation. Notwithstanding the value and the benefits of using a renewable energy source, the national hydroelectric power generation brings inconstant production levels due to the weather and hydrological conditions of the area. In addition, the high level of distribution losses forces the country to resort to considerable imports in order to meet the growing national demand, with consequent negative effects on Albania's economy. Both these issues do not allow the energy sector to have a self-generation capacity and to be financially self-sustaining, together with distorted electricity prices, low collection rates and high arrears. As it absorbs over half of all Albania's electricity supply (Eurostat, 2015a), with an increase in consumption by 50% between 2003 and 2014 (Eurostat energy data, n.d.) and a floor area of over 40 million m2 (INSTAT Census 2011), the residential sector represents a huge opportunity to reduce energy misuse and address energy deficits. In this context, the National Energy Efficiency Action Plan (NEEAP) sets an energy saving target of 9% of the average final consumption by 2018. However, the complex Albanian regulatory framework, which does not provide government incentives to EE investments, and the lack of knowledge of the market potential prevent the development of a serious EE program. In addition, the sector is characterised by a lack of specific expertise, therefore a lack of knowledge of available technologies and benefits of application. Within this framework, a study conducted by researchers from the Polytechnic University of Tirana, Aalborg University in Denmark, Gridkraft LLC in Seattle and the American Council for an Energy-Efficient Economy (ACEEE) in Washington, published in 2015 and based on a sample of 70 residential units in Tirana, investigated the real share of electricity attributable to the different residential uses and the factors affecting each type of electricity consumption. Many countries in Europe offer examples of how to sustainably meet household energy needs, and how to address the most critical areas of energy use. Here, the knowledge of the context and a realistic attitude are the instruments needed to face the demanding conditions by exploring the existing potential of places with a new inventiveness. This innovative approach inspires original design and planning solutions, able to address higher-order problems and trigger innovation processes.

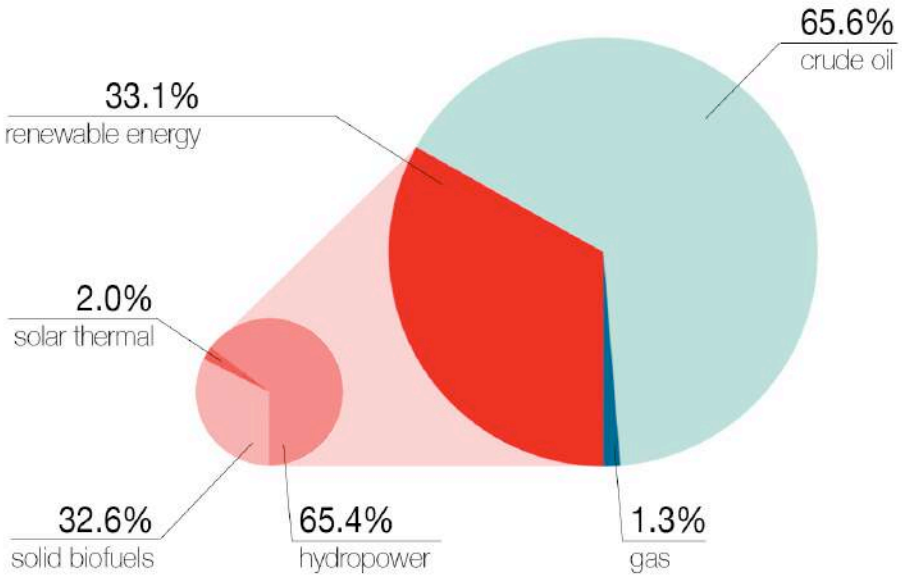


Fig 1 / Primary production of energy by resource (2014)
source / Eurostat energy data, elaborated by the author

How can the knowledge of these realities innovate the way we look at Albania's energy issues? What do these experiences mean for Albania and for developing countries in general? And what could be the impacts on urban and local policies? Starting from these examples, the challenges facing Albania's energy sector are not only the limit to its socio-economic growth, but conceal a huge potential. They reveal to be the occasion to address the demanding economic and climatic conditions through innovative design solutions, which will become new drivers of sustainable development for Albania.

Introduction

Albania is experiencing a transition phase into a competitive market economy. Yet the country's development is constrained by an insecure power supply and mounting contingent liabilities, for which the energy sector is not able to be financially self-sustaining. Within this framework, electricity represents the toughest issue. The total dependence on hydropower generation and its vulnerability to weather patterns leads to a lack of self-generation capacity and financial self-sufficiency. This, together with the high level of distribution losses, which requires significant power imports, is adding financial stress to the sector and the economy. Being the main responsible factor for the national electricity misuse, the residential is at the same time one of the most problematic sectors in Albania's energy consumption and one of the areas with the highest potential in achieving a sustainable energy use in the country since it conceals a huge untapped energy saving potential. This issue is strictly related to the NNEAP, which has defined a series of energy saving strategies targeting the household energy consumption in order to reach the environmental goals set by Albania for 2020.

However, the challenges facing the national energy and economic sectors share their starting point with the experiences offered by some European countries. In these realities the demanding conditions have become chances to define innovative design solutions able to take advantage of the existing resources and trigger processes of sustainable development.

Therefore, a focused action aimed at optimising Albania's use of energy, especially in those areas characterised by massive and irrational consumption, could incite unexpected innovation processes.

Albania's energy sector

In 2014, Albania's total production of energy was about 2.0 Mtoe (million tons of oil equivalent), of which 65.6% was crude oil, 1.3% was natural gas, 33.1% was renewable energy. Solid fuels and nuclear energy amounted to 0%.

In particular, in the renewable energy sector, hydropower represented 65.4%, solid biofuels were 32.6%, solar thermal accounted for 2.0%, while geothermal and wind power were 0% (Eurostat energy data, n.d.).

Given the national significant role in the oil sector, and despite a negligible gas market due to the minimal gas supply, Albania's economic challenges are currently greatly affected by electricity, the production of

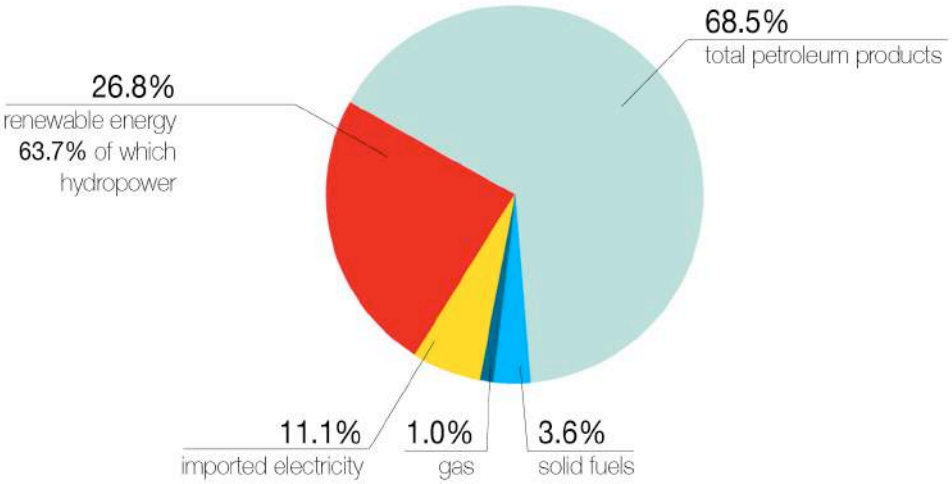


Fig2 / Gross inland energy consumption by fuel type (2014)
source / Eurostat energy data, elaborated by the author

which is totally based on hydropower.
In spite of being a renewable energy source, which forbids fossil fuels and could enable Albania to produce its own energy without being reliant on international fuel sources, hydroelectric power is subject to the weather and hydrological conditions of the country, which result in neither a constant nor a reliable production. This limit, along with the high level of distribution losses, distorted electricity prices, low-collection rates and high arrears, requires significant imports in order to meet the growing national demand, adding financial stress to the economy.
For all these reasons, the energy sector is not able to be self-sustaining in terms of electricity production, and consequently to be financially self-sustaining. One of the factors that negatively contributes to this issue is represented by the structure of the electricity market, which is dominated by state-owned companies both on the wholesale and the retail level, as well as for the transmission system.
Within this framework, the new Power Sector Law, adopted in 2015, addresses the liberalization of the electricity market, treatment of public service obligations, unbundling of the transmission system operation, powers of the national regulatory authority, supply of electricity and customer protection (Energy Community Secretariat, 2015).
Taking into account the country's final energy consumption, the leading sectors are represented by transport and residential, which respectively reached 44.2% and 27.3% in 2013, while the main leading sector in the electricity consumption is residential, which accounts for 55,1%, followed by industry and services, which represent 19,8% and 18,7% (Eurostat, 2015a).

Historic development and future trends in energy use / the dynamics involved

A critical analysis of the characteristics of the country's energy production and consumption allows the making of useful observations on how the use of energy is evolving over the years.
The absence of price regulation conditions, along with the too expensive alternative energy sources, has led people to use electricity, the overconsumption of which has led to high levels of non-technical losses and a reduced security of supply.
Although the improvements in energy intensity , started from 2000 (Knoema World Data Atlas, n.d.), should be a positive sign, this dynamic is actually a result of the collapse of heavy industries, to the leading amount of hydropower production and the growth of financial resources coming from abroad, firstly those linked to Albanian emigrants. In fact, considering the total final energy consumption, the trend shows a continuous increase (Eurostat energy data, n.d.), which suggests the urgent need to define energy-saving strategies and to prevent energy consumption from increasing proportionally towards economic growth.
Moreover, the challenges brought by the process of transition, especially the heavy price increases, could decrease the poverty level of low-income and vulnerable families, which perhaps cannot afford utility energy services.

Electricity	2013	2014
Electricity production [GWh]	6,957	4,726
Net imports [GWh]	2,322	3,356
Net exports [GWh]	1,425	288
Gross electricity consumption [GWh]	7,986	7,815
Losses in transmission [%]	2.3%	2.1%
Losses in distribution [%]	45.0%	37.8%
Final consumption of electricity [GWh]	4,530	5,011

Fig3 / Electricity (2013-2014)
source / Energy Community Secretariat (ECS), 2015, elaborated by the author

	total	solid fossil fuels	gas	crude oil & petroleum prod.	renewable energies
Final energy consumption	1,875	67	6	1,103	699 *
Industry	258	63	6	83	106
Transport	828	0	0	828	0
Commercial and public services	166	4	0	33	129
Residential	513	0	0	80	433
Agriculture / Forestry	60	0	0	50	10
Fishing	29	0	0	29	0
Others	21	0	0	0	21

* 486 ktoe of hydropower

Fig4 / Final energy consumption by sector (ktoe) (2013)
source / Energy balance sheets - 2013 data, elaborated by the author

	electricity
Total consumption	686 *
Industry	136
Transport	0
Commercial and public services	128
Residential	378
Agriculture / Forestry	14
Fishing	0
Others	30

* 486 ktoe from hydropower
200 ktoe from imports

Fig5 / Electricity consumption by sector (ktoe) (2013)
source / Energy balance sheets - 2013 data, elaborated by the author

1 / Energy intensity is a measure of the energy efficiency of a nation's economy. It is calculated as the ratio between the total primary energy supply (TPES) and the gross domestic product (GDP).

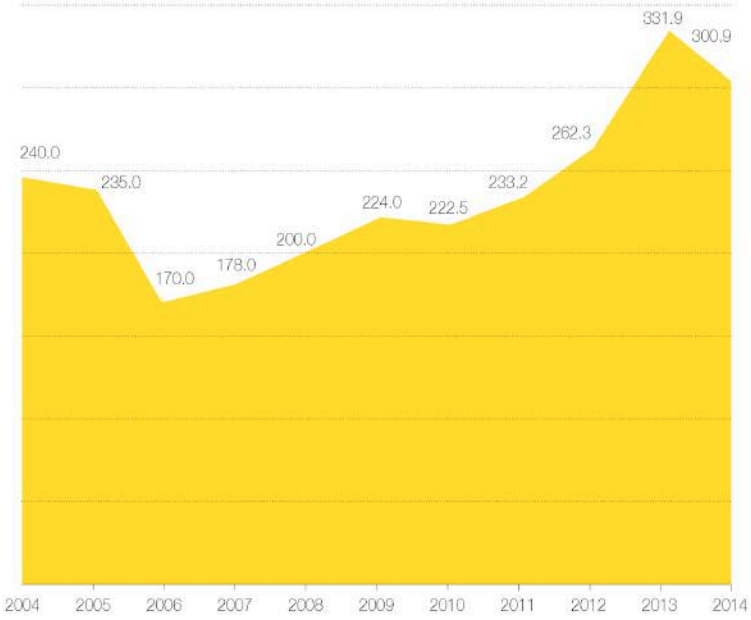


Fig6 / Electricity consumption by households (ktoe) (2004-2014)
source / Eurostat energy data, elaborated by the author

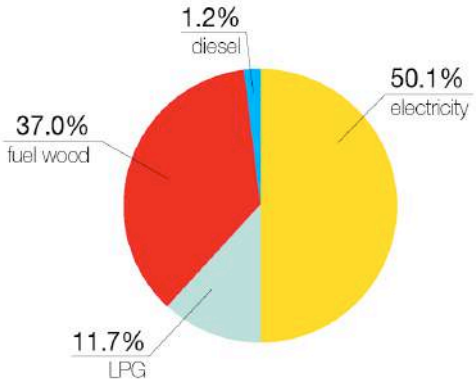
Key objectives for 2020

In the frame of EU integration process, the country has set a series of environmental targets for 2020:
- reduce greenhouse gas emissions of 20%;
- increase the share of renewable energy sources in energy consumption by about 38%;
- improve energy efficiency (EE) by 9% until 2018, 31% of which should be achieved in transport, 25% in industry, 22% in households, 19% in services and 3% in agriculture, according to the National Energy Efficiency Action Plan (NEEAP). The goal is to reach 10% until 2020.

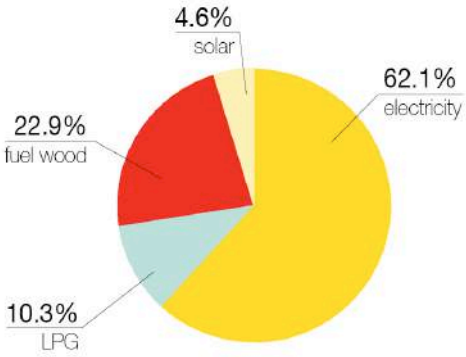
In order to reach these goals, the NEEAP has defined these main quantitative and qualitative measures addressed at various aspects of residential energy use:
- thermal insulation of buildings, to reduce the energy demand for space heating and air conditioning as well;
- introduction of central and district heating schemes, which will contribute to provide space heating and domestic hot water (DHW), especially in new apartments of multi-storey buildings:
- introduction of LPG, to reduce the quantity of electricity used for space heating and cooking;
- introduction of solar systems for DHW production, in the place of electricity;
- use of energy-efficient lamps in order to decrease the amount of electricity employed in lighting (NEEAP, 2010).

Household energy consumption / how Albania became addicted to electricity

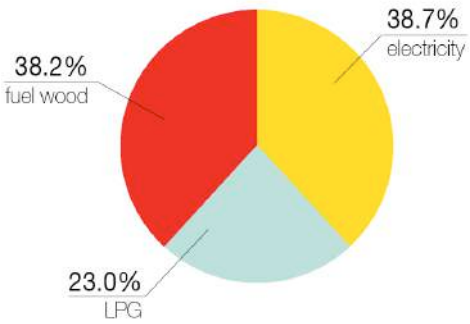
As demonstrated by the data mentioned above, residential is one of the leading sectors in the country's energy consumption. At the same time, electricity is the main energy source used by households, and the trend shows an annual growth. In addition to it, residential energy services are covered by fuel wood (for heating purposes and DHW), LPG (for cooking), and partially by solar and diesel.
The current energy situation can be better understood by looking at Albanian history in terms of energy. In the second half of the 19th century, the communist government (1945 – 1990), aiming at the complete independence of the Albanian economy from the foreign countries, started to exploit the national hydropower potential. At the same time, at the beginning of 1950, the government organized schemes to use fuel wood for heating purposes, also because of the big forest areas present in the country. For these reasons as well as undeveloped infrastructures for using other energy resources, including renewable energies, the amount of fuel wood used in Albania was very high until fairly recently, 1992.
This tendency started to change from 1992, when the share of fuel wood used for heating and DHW began to decrease in rural areas, due to the substitution of wood with electricity. In addition to this, there are two other dynamics explaining the decreasing trend. On the one hand, woods are protected as part of natural protected areas, and on the other hand, the demand for industrial use is very big, ensuring a good income to rural households. Therefore, although the potential for energy use is high, wood



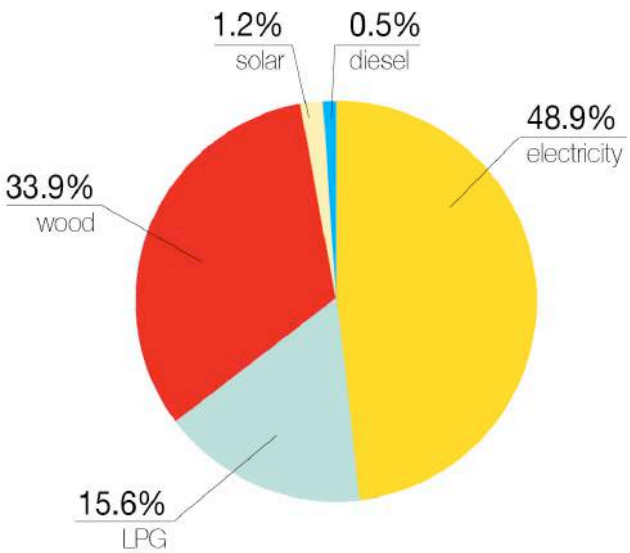
Space heating energy consumption by fuel



DHW energy consumption by fuel



Cooking energy consumption by fuel



Final energy consumption by fuel

Fig7 / Final energy consumption in households by fuel and by use (2013)
source / INDC Technical Background Document: Albania vers25.08.2015, elaborated by the author

is used for purposes other than the production of energy.
The same decreasing process applies to the share of hydropower. Since the demand for energy is increasing, while the national hydropower production capacities have remained the same since 1986, the amount of domestic electricity production is decreasing with a consequent growth in imports (Cela and Himzo, 2009).

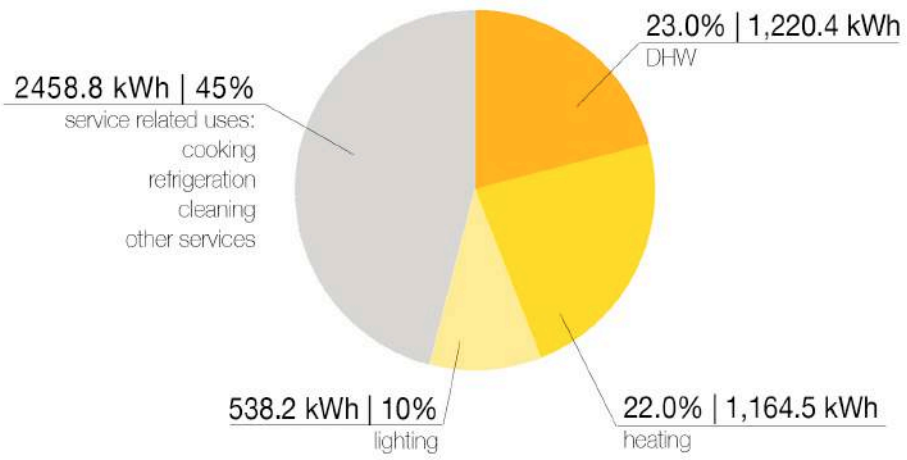


Fig8 / Breakdown of annual average electricity consumption for single household (2012)
source / Evaluation of the heating share of household electricity consumption using statistical analysis: a case study of Tirana, Albania, elaborated by the author

Household electricity consumption/ a study revealing the real share of electricity attributable to the different uses

A study conducted by researchers from the Polytechnic University of Tirana, Aalborg University in Denmark, Gridkraft LLC in Seattle and the American Council for an Energy-Efficient Economy (ACEEE) in Washington, published in 2015, aimed at investigating household electricity consumption, producing interesting results (Bidaj et al., 2015).

The research underlines further elements affecting the increasing electricity consumption, such as the high rate of rural-to-urban migration and high system losses which amounted to 41% of the total electricity production in 2012. Only 18-20% of these are due to technical problems, while the majority - nontechnical losses – are linked to non-payment, theft, etc. (Bidaj et al., 2015).

The importance and urgency of the problem is demonstrated by two factors: the distorted electricity prices, which are higher than in other regional countries, and the frequent electricity shortages and supply disruptions.

In order to investigate this issue, the study takes into consideration a sample of 70 residential units chosen from different zones of Tirana, during a two-year time period: 2011 - 2012. All the units have an average number of dwellers of 3.4, were built between 1980 and 2010, lacks insulation and have single-pane glass windows.

The research analyses the monthly electricity consumption of the several case studies, and, in particular, the three major uses of electricity: space heating, DHW, lighting and appliances.

The results show that:

- The average annual electricity consumption of a residential unit in Tirana during 2012 is 5,382 kWh. The data reveal an increase of 6.86% compared to 2011, due to the rising incomes and changing climatic conditions which cause an increase for the cooling demand.
- The share of electricity attributable to heating amounts to 21.63% of total electricity consumption, that is 1,164 kWh;
- Electricity used for the production of DHW is the main variable in household electricity consumption since it depends on the outside temperature and human behaviour. It is 22.7% of a household's total electricity consumption, therefore it is comparable to the amount of electricity used for heating.

An attentive analysis of the obtained results suggests consequent energy saving strategies, recalling the measures predicted by the NEEAP: thermal insulation of buildings and introduction of household-scale heat pumps, combined with solar thermal systems for the production of DHW. In fact, Albania's solar energy potential is excellent since the country has among the highest number of sunshine hours per year in Europe, an average of 2,500.

Therefore, three of the most critical issues in household energy consumption, such as building insulation, space heating and DHW needs, are at once the most potential areas to improve the country's development. These factors represent

Tirana (Albania)

HDD	1815
CDD	467
Average summer temperature	23.3 °C
Average winter temperature	7.7 °C
Average annual sunshine hours	2526

Rome (Italy)

HDD	1253
CDD	786
Average summer temperature	22.8 °C
Average winter temperature	7.0 °C
Average annual sunshine hours	2516

Fig9 / Climate data for Tirana and Rome
source / Ecofys VII and ClimateData.eu, elaborated by the author

the limits and the tools to achieve a sustainable energy use in Albania.
The share of electricity used to meet the service-related uses, amounting to 45% of the total electricity consumption, could be reduced through the legislation and implementation of legal framework for labelling of electric appliances according to efficiency classes based on European standards (Classes A-B). An appliances-labelling scheme has already been introduced in Albania but it must be improved and strengthened by regular inspections and reporting by the State Inspectorate. At the same time, this EE measure should be followed by the introduction of minimum standards for electric appliances. The prescriptions of the EuP-Directives for electric appliances should be stepwise transferred to the legal framework in Albania.

Unlocking the residential energy saving potential: a housing prototype as a prospective instrument for – and in comparison with – the typical Albanian house

From all the observations considered above, we can state that the residential sector - because of the challenges which affect it - actually represents a precious opportunity, since it conceals a huge untapped energy saving potential. Every strategy able to use household energy limits as a resource becomes a new driver of sustainable development for Albania.
In order to test this approach to the country's energy issue, innovative for a context like Albania but already widespread in most European developed countries, and starting from the possible EE strategies mentioned above, we will take into consideration a housing prototype as a potential instrument to trigger energy saving processes. The first step consists in finding a context with weather conditions similar to those of Albania. Although the country has a high number of climatic regions, its climate can be classified as hot-summer Mediterranean (Csa zone according to the Köppen climate classification), as most Mediterranean countries, especially the cities of Central and Southern Italy. Taking into account other weather parameters, the most comparable city to the Albanian capital results to be Rome, Italy.

RhOME for denCity

The Italian project RhOME for denCity is the winner of the 2014 Solar Decathlon Europe, an international competition in which universities from all over the world meet to design, build and operate an energy-efficient and cost-effective home, thanks to the use of solar energy and equipment with all the technologies useful for maximising efficiency.
The project was designed by a multidisciplinary team of the Università degli Studi Roma Tre and was awarded the first prize for social housing by Cecodhas Housing Europe. In addition to this, RhOME for denCity is the starting point of the research program Building at Positive Energy for the Urban Regeneration of Informal Settlement, which is focused on the development of sustainable housing prototypes able to trigger processes of urban regeneration.

energy data

RhOME for denCity
single residential unit

heating energy demand:	6 kWh/m²y
cooling energy demand:	12 kWh/m²y
DHW energy demand:	5 kWh/m²y
lighting & appliances energy demand:	40 kWh/m²y
overall energy demand:	63 kWh/m²y
average annual electricity consumption	16 kWh/m²y
photovoltaic system production:	97 kWh/m²y

Rome shares the problem of informal housing and illegal settlements with Albania (UN, 2009). Within this framework, RhOME for denCity tries to redensify and requalify a quarter characterised by high fragmentation, where the basic services and the hierarchy of spaces are missing, by improving low energy city living through passive solar design and urban connectivity.

The research project is 'an opportunity to deal with the current global challenges starting from local scale solutions (RhOME for denCity, 2014). This approach presents an innovative change of attitude which is emerging in the field of architecture, where few architects have started to face the demanding local conditions by exploring the existing potential of places with a new inventiveness (Lepik, 2010). RhOME for denCity is designed to produce more energy than it consumes, up to partially supporting the area where it will be built.

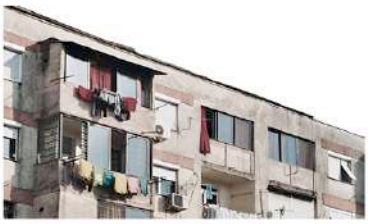
The project develops within four storeys and is composed by eight apartments with different sizes arranged around a central column for services. The volume consists of a wooden envelope with movable screens, loggias, balconies and thick walls in order to take advantage of thermal inertia properties, reaching extremely low-transmittance values. In this way, the house optimises heat gains in winter and minimises those in summer, achieves the highest quality of natural light, creates comfort conditions without energy waste and better integrates photovoltaic and thermodynamic plants for the uptake of solar power.

Each residential unit is provided with:

- a heat pump of 20.4 kW with an energy efficiency ratio (EER) of 4 for cooling demand;
- a photovoltaic plant of 5 kW peak power for the electrical demand;
- a pellet boiler of 30 kW for heating demand.

The CO_2 emissions are decreased by 23.5 tons per year if compared to a plant conventionally used in a residential building.

The structure is made with frame-wall technology (Platform Frame), which is a dry construction system, efficient from the



Albania's building stock
single residential unit

heating energy demand:	56 kWh/m²y
cooling energy demand:	28 kWh/m²y
DHW energy demand:	18 kWh/m²y
lighting & appliances energy demand:	53 kWh/m²y
overall energy demand:	249 kWh/m²y
average annual electricity consumption	97 kWh/m²y

Fig10 / Energy data of a residential unit of RhOME for denCity and a typical Albania's residential unit source / technical data sheet RhOME for denCity, " The Typology of the Residential Building Stock in Albania and the Modelling of its Low-Carbon Transformation, Evaluation of the heating share of household electricity consumption using statistical analysis: a case study of Tirana, Albania, Renewable energy scenarios for Albania", elaborated by the author

point of view of energy. It is lightweight, fast to assemble, reduces costs and the need for specialised workers. The building construction is characterised by the reuse of local building materials, reducing the environmental impact of the intervention and producing new skills and job opportunities. In this way, the waste of one phase becomes a resource for another.
The flexible design allows the volume to grow and adapt according to the changing needs. The first phase consists in the construction of the main part of the complex, then the resulting materials are placed inside a shed within the lot. When the residents have the financial resources, the process continues through the construction of new expansions. This allows to reach the lot's maximum saturation.
The innovation is to think about future transformations in the design phase, in order to prevent illogical expansions. The return on investment is calculated in 5 years with a cash flow higher than 350,000 € after the 15th year (Battista et al. 2015). If we compare the energy data of a single unit of RhOME to the ones representing the energy consumption of a typical Albanian household located in Tirana (climate zone B), the huge energy saving potential of the project RhOME for denCity becomes clear.

The data regarding the energy consumption of the Albanian household acquires higher importance if we consider that people heat and cool only part of their dwellings and for only part of the day.

2 / The aim of the paper in this phase is just to propose a tool, therefore, for all specific information please refer to the references.

In particular, about only the 60% of the dwelling area is heated in the climate zone B, and households using electricity heat for 10 hours per day. The calculations take into consideration that if the entire dwelling area during the whole day is heated, final energy consumption would be at least double (Support for Low-Emission Development in South Eastern Europe (SLED), 2016).

Conclusions

The ongoing development process and Albania's potential growth still coexist with the backwardness and unawareness which characterise some aspects of the country. However, many countries in the world are offering examples of what occurs when the cities and the existing demanding conditions are considered strategic and potential resources for their occupants, 'proving that scarcity of means can stimulate technical inventiveness' (Galiano, 2014). These are examples of how looking at the context with a realistic attitude and awareness of the problems and of the potential enables looking at challenges as opportunities and developing innovative design solutions able to take advantage of the existing resources. The housing prototype RhOME for denCity is designed for a context with almost the same starting conditions and problems of Albania - informal settlements and urban fragmentation - and which aims at the same objectives -reducing energy misuse and sustainably meeting household energy needs by using the existing local resources.

The high-performance wooden envelope of the prototype, which optimises winter heat gains and minimises those in summer by taking advantage of thermal inertia properties, represents a possible solution to the Albania's issue of the poor thermal insulation of buildings. In this way, the energy demand for space heating and air conditioning could be reduced, also by using one of the biggest country's resources which is wood.

Being equipped with a household-scale heat pump, RhOME for denCity addresses Albania's electricity misuse to provide household space heating and cooling. As regards the DHW production, the Italian housing prototype is characterised by a photovoltaic plant, offering an effective alternative to the typical Albanian use of electricity. Furthermore, the introduction of solar systems could allow the country to take advantage of its excellent solar energy potential. RhOME for denCity achieves the highest quality of natural light combined with a high-performance artificial lighting system, which is linked to the Albanian aim of reducing the share of electricity for lighting. In addition to this, CO2 emissions are cut by 23.5 tons per year.

All the design strategies mentioned above follow the measures defined by the Albania's NEEAP in order to reach the environmental targets set for 2020, which are fundamental in the frame of the EU integration process. Taking into account the country's social issues, the Italian housing prototype is thought as an instrument for the urban regeneration of informal settlements, a problem which deeply affects Albania. Through the reuse of local building materials, the environmental impact of the intervention is reduced, while new skills and job opportunities are produced.

RhOME for denCity is designed in order to grow and adapt according to the changing needs. In this way, it addresses the tendency for Albanian people to build their homes by taking into account future expansions and often self-constructed additions, depreciating real estate values. The flexible design of the prototype could seriously consider this specific aspect of the Albanian culture and, in addition to this, it could take advantage of it: homes harmonically developed over time acquire value and become a shortcut to equity and wealth. As it happened for the Chilean Social Housing program of the architectural team Elemental, this demonstrates that 'realism can greatly improve policy: self-construction was ignored in government policy but instrumentalised by designers' (Cook and Boyer, 2010). The result is not only a project, but the generation of a process of local sustainable development.

The data considered above show that 'Albania's energy challenges can be viewed as opportunities to respond to the country's changing economic and climatic conditions with smart choices that provide Albanians with reliable and sustainable energy services' (Bidaj et al., 2015).

A higher level of energy efficiency will positively affect the country's development firstly on a building level, by improving the energy performance of buildings, along with air quality and thermal comfort, cutting energy costs for private households and increasing real estate value.

On a national level, a more sustainable energy use will contribute to the implementation of the NEEAP and will raise energy security, also bringing significant benefits to the country's economy such as higher competitiveness, poverty alleviation and social inclusion.

Taking into account the urban and local policies, these experiences are opportunities to face the current global challenges, starting from local scale solutions moving towards addressing higher-order problems and trigger innovation processes.

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From intersectorial plans to territorial cohesion policies in rural development and protection in Albania

keywords / public policy, decision making, public financing, environmental protection, rural development

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Abstract

This paper derivers as a result of the workshop held at POLIS University in Tirana and the University of Ferrara involving PhD Candidates of the 30 and 31 cycles, during the period of January and February. The special feature of this workshop was the involvement of various profiles within a single argument - that of the "Seman River" area (located in central Albania). The emergence of this various scientific fields has been taken into consideration in this paper, including here biological sciences, rural landscape, and coastal development, in order to give the territory an interdisciplinary analysis - especially to the rural one.
Due to the lack of public policies on the above mentioned areas also as a result of 25 years of communist regime, has left the area without any kind of governance tools (such as tax collection and public investment), aggravating its development by not utilizing the true potentials of the area, such as the natural resources (gas), water supply, and agricultural fertility.
Moreover, due to the new Territorial and Administrative Reform on the third administrative level (with new born Municipalities) have not envisioned any approaches to rural development, public capabilities, where regulatory and financing tools remain up to the First Administrative Level.
According to Co-Plan (2014), which studied various scenarios in shaping future Second Administrative Level in Albania (the Regions), policies at this administrative level clearly need to deal with at least two features; Rural Development and Environmental Protection.
The challenge of this paper is to open possible new direction of these features through the first administrative level - where at the moment everything seems concentrated at this decisional context - and urge the need for a Second Administrative Level, in order to give new insights for future governance capable of lead Rural Development. From the point of view of the originality to study and read the hindering factors of rural development, this paper will try to find alternative solutions of the rural territory government through the study of decision-making context - in order to find at least one element in this context that we can change in order to direct this development. For this reasons, as we will see below, three directions have been proposed to understand the decisional context; Land property issues / Monitoring and Certification Programs / Financing tools.
Finally, this paper will explore the proposed directions addressed from the First Administrative Level through a policy evaluation process, highlighting the possibility of programs dealing with the stated problems.
The last chapter considers financial feature as an alternative solution in seeing rural development issues and problems in a holistic way - considering the development as cohesive process. Also highlighted in Fig. 1, the Seman River pollution from oil gas activities has a close relation with the agricultural land and its hindering factors. This creates the need to explore the rural development as a holistic and cohesive action starting from a necessity to address the environmental protection.

Introduction to the area

When we talk about Albanian rivers there's nothing more sorrowful and hopeless than when we see their natural condition and the effect that the human impact has on it. For many years the water basin has been subject of illegal earnings from various groups (single inhabitants, companies) linked to the building sector or other. The extraction of raw materials has changed over times the river basin, leaving space to flooding and soil erosion, setting up a negative overall image for all Albanian rivers from the north to the south. The case study that we explored during this workshop shows us a unique situation, where the issues mentioned above are intersected with many administrative levels and in different territorial contexts.
The area that the workshop focused on was the Seman River area, covering different territorial contexts, combining a series of multifaceted problems of the human health and on the environmental impact.

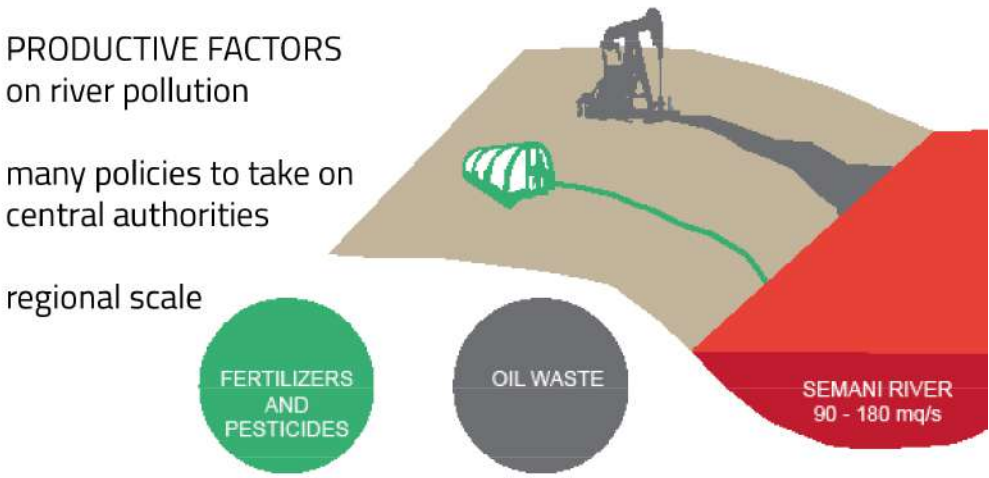
From the complexity of the two dynamics mentioned before; administrative level and territorial context this paper considers separately the rural issues from the urban ones. The human factor stands as the main indicator in regards of river pollution in the city of Fier (3 km away).
The other two indicators stand as productive factors and are related to oil drill activities, three oil drill camps (Fushe - Marinze, Kucove, Ballsh, crossing Osumi river and Gjanica river), and the informal productive chain of agricultural goods in Myzeqeja field - which covers around 5% of the national area. A schematic separation between human factors and productive factors is also illustrated in fig.1. If we consider this separation by context it would be urban and rural, or by territorial governance - local and central level. This last separation is crucial in understanding the importance of the central government in shaping the future development of new born municipalities (Law 115/2014 'Territorial Reform). Although the Law no. 10119 "On Territorial Planning" removed the 'yellow line' as an urban borderline concept, and opened it to a broader concept of territorial development, many rural issues remain obsolete from central government policies, and strongly decisive on local impact.

Studing The Decisional Context: The Importance Of A Holistic Problem Solving

Among few attempts in analyzing and classifying the context, M. Jänicke's work (2005) on development of environmental policies in a comparative perspective, suggested an analytical framework in which he refers to the structural context of policy making - that is divided into three different categories: cognitive context, economic context and institutional context.
According to Dente (2010) the decisional context or environment is the set of structural or contingent factors and conditions that influence decisional processes and contribute to the determination of their outcomes, but cannot be modified by actors, nor in particular, by those interested in the policy decision.
Each decisional process, in fact, is carried out in a given space and in a given moment in time so it is reasonable to expect that everything that is possible or impossible here and now, will not be in another place at another moment. Dente (2010)
Keeping this separation, from rural - urban, as a public administrative issue many contingent factors on territorial development for the new born municipalities rises.
With the new law on territorial decentralization of the third administrative level (Law 115/2014 'Territorial Reform) one of the main challenges of the municipalities is to connect the city with the hinterland, by including productive sectors such as agriculture and other sectors related to environmental issues, which are hanging on from the first administrative level policies, such as; Land property issues, Monitoring and Certification programs and Financing tools.

a) Land property issues in the agricultural sector: Between Uncertainties and Conflicts
According to Law nr. 7501, dated 19.7.1991, the agricultural land has previously been given for use to families in the rural areas; specific number of hectares per person, without the possibility to sell or buy new land. On the other hand, the overlapping layer of the old owners before the communist regime, which claim their ownership, requires an immediate institutional response on the decisional context. Even where the law does not provide sale agreements, acts of purchase and sale has been made between informal arrangements - generating conflicts; overlapping ownership, changing also the cognitive context.

b) Monitoring system, and certification programs of productive sectors - to oil drill



activities and to the agricultural sector.
Fieri Municipality and the surrounding area have been known for a long time for its fertile and extensive land of agricultural production. Muzeqeja field, as it's named, at the beginning of the '90 covered almost 25% of national forage production and other varieties.
Nowadays it would be difficult to estimate the national importance of this regional area, which surely remains one of the most important resources for the local communities and villages.
Moreover, the informal market and the low cognitive context use of pesticides, based in an uncontrolled and uncertified market, has caused serious effects on the environmental impact and also on the irrigation canals. On the other hand, the inability of the public administration's in stimulating policies in order to assess and monitor the impact of the productive factors on rural areas with an intersectoral policy, involving various ministries, rises a crucial and sectorial question on "who should lead future policies in such a complex institutional and cognitive context?"
According to the Intersectorial Coastal Plan of the Ministry of Urban Development a particular attention should be given to local communities living in the coastal areas and along the sea side, hence no program of this ministry has included these communities in this plan (Intersectorial Plan Coasts, draft plan).
From the other side, the three oil camps; Fushe Marinez, Kucove and Patos show the most relevant national resource according to the Ministry of Energy and Industry and it's incomes.
From this point of view, the two ministerial sectorial plans show a fragmented vision in leading this intersected and conflictual national priority.
According to the Intersectorial Plan of the Ministry of Environment and Forest Management, "Strategjia Ndersektorial e Mjedisit", 2013-2020, there's no guideline document regarding industrial incidents from toxic pollution, or on management of incident; toxicology; methods of decontamination; or equipments that could be used during the occurrence of a chemical emergency. Another thing to bear in this final claim is that of the institutional ability to monitor the environmental impact of the oil sector which is infrequent and has low results.
Hence, it is crucial to specify that is the responsibility of the Ministry of Environmental and Ministry of Energy to monitor the industrial impact, in order to design policies on environmental and human health. Various studies (Guri, Aliu, Lubonja 2013) on oil drill activities and their impact in the ecosystem, have revealed conclusions of severe impacts of the health of the community living around Fier.

c) Financing tools / Actually there are two financing sources from the Central Government regarding the rural development; the Albanian Development Fund (Fondi per Zhvillimin e Rajoneve) and various Ministries.
The first has actually invested only on 2015, 1/70 of it's budged for environmental issues and only 1/12 for

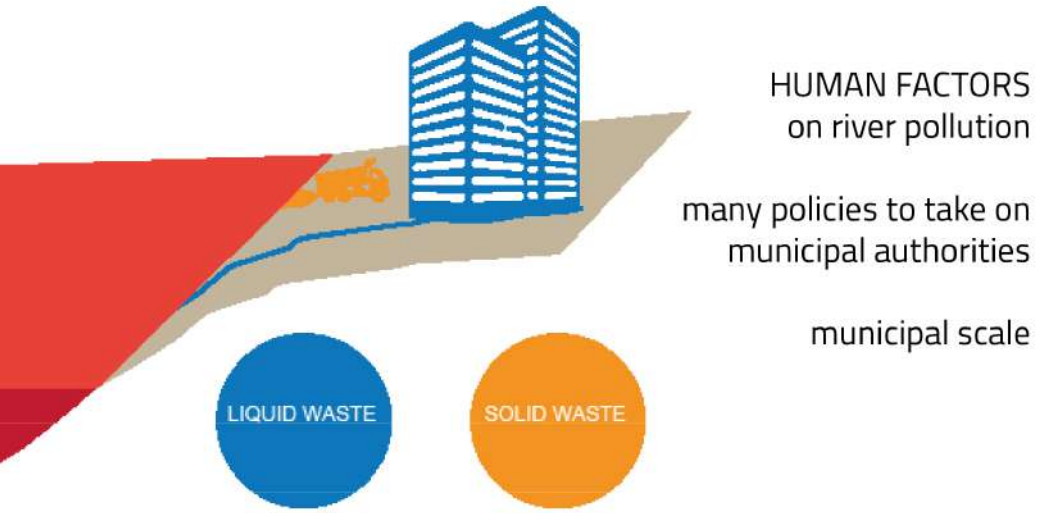


Fig 1 / "Rural - Urban", Seman River as a transmitter of potentialities and threats - from Oil drill camps to agricultural land / source drawing by the author

rural water supply. (Annual Report of the Regional Development Fund,2015). Thus most of the budged was allocated for street reconstruction 52,525,679 € (Projects 1); for rural water supplies 5,058,760 € (Projects 2); environmental projects 824.218 €; educational projects 331.168€; requalification of urban squares 1,017,946€; and the Museum of Photography Marubi (Marubi Fototeka) 760.971€. (FSHZH, annual activities report, 2015)

Regarding the Ministry of Agriculture the financial tools relate to single farmers with a high capital invested already, or with a reimbursement till 10.000 Euro of input capital. The character of these policies are aimed for farmers which have already made their investment in the sector – and not those who for underlying reasons can't get into the productive sector, even if they were already part of it.

Beyond the limited financial tools, the same report from the ministry where the sector of agriculture is facing many problems, in one way or another makes the environment context non-fertile for future investments, such as: i. losses in manufacturing, ii. small surface of the farm (medium 1ha per farm), iii. lack of manpower (due to international and internal migration) and iv. low level of technology, v. high prices of agricultural inputs, vi. lack of unity among producers (cooperation), etc. If further investigated on the actual situation, this ministry currently has 3 ongoing projects, where the first one aims the financial support (Sared Project); the second a 'vacant' public work assumption (with particular skills and abilities) and the third one the rehabilitation of water canals and irrigation projects.

Directly or indirectly, the financial investment in agriculture comes out as a redistributive policy from the Ministry of Energy, an amount of capital which the extracting company operating in Fushë Marinzë and Kuçovë should make on environment and human health. It's a Public Private Partnership at a high level of agreements, between the state and big corporate, such as Bankers Petrolium, which operates in the area of Fier.

One of the questions that rises consist on the fact that this agreements have local repercussions and if affirmative what character and on which sector? Referring to Bankers Petrolium in 2014 this company has invested 70 million USD on health, environment and safety, approximately 60% to abandoned oil wells, and 30% to direct environment.

If the reactivation of the old industry (the oil wells) has been considered as an environmental issue to invest on (60% of the total amount), which is the next aim after the oil wells will be reactivated?

Consideration on decisional context

According to M. Jänicke's the analytical context mentioned before, cognitive, economic and institutional context, some findings can be as such;

Cognitive context (Environment): The uncertain ownership and the overlapping layers of laws have harmed seriously the cognitive market of purchasing land, where the agricultural sector is part of it. From the other side, this uncertainty in the

agricultural sector 'enjoys' an unbalanced tool-market, which is hardly controlled by the national institutions, such are seeds and pesticides.
Institutional context (Environment): regarding the institutional environment it can be said that some policies have moved, particularly in the Myzeqe area - where acknowledgment of the agricultural property process from the public has had success. One of these factors that pushed this process is also the need to expropriate private agricultural lots due to the Trans-Adriatic-Pipeline project (TAP). In addition to the commitment of the Ministry of Urban Planning for the National General Plan there's no map at national level regarding the recognition phase of agricultural property with various layers of ownership, although some processes have taken place but in an sporadic way. According to some studies only 80% of land should be given to farmers by law 7501 is registered by the cadastral offices in Albania - but no map is available at public or academic audiences or use.
The first week of April, 2016, heralded the beginning of a new governmental campaign on the recognition based on law 7501 on the agricultural land as private property, starting in Novosela area (Fier-Lushnje city), in a similar process as the building sector, (ALUIZNI - the national agency for the legalization of informal settlements), the remaining 20% still has not obtained the certification of property.
Economic context: according to agricultural basic needs, the starting capital is strongly related to oil consume and water system for the irrigation. Actually Albania has the highest price for litre of gas and no policies for agricultural purposes aim in obtaining a lower cost of it. As far as the water system many policies have aimed in directing investments on irrigation canal. Another remaining factor for a difficult process of cultivation, but not last, is the high cost of fertilizers on the Albanian market.

Choosing between Land property issues, Monitoring and Certification Programs and Financing tools; the importance of a holistic problem solving.
- Land property issues:
If land fragmentation stand as a hindering factor to the agricultural sector, distributive and redistributive public policies (financing tools from the Government, as in the picture below) will not solve the problem of the agricultural sector due to a low level of monitoring the oil drill activities and river pollution.
- Monitoring and Certification Programs:
If public policies of the Ministry of Energy and Industry will help in solving the problem of pollution in rivers from oil drill activities and later to the agricultural field (including pesticides etc.) - the low financing of local farmers by a meritocratic system, such as subventions, will not solve the undeveloped agricultural of Albanian system due to the problems listed by the Ministry of Agriculture mentioned before (low level of technology, losses on manufacturing etc).
- Financing Tools:
If public policies of FSHZH (Albanian Development Fund) will cover finances on irrigation canals and on watersheds the problems listed above will prevail on solutions.

On this condition it's clear that the geographic and administrative triangulation requires a horizontal cooperation or umbrella process to see the problem solution in a holistic way among actors and public policies.
Intersectorial plans from the Ministry of Urban Development, seems to be the only one which tries to put regulative public policies in a broader vision considering problems and defining planning priorities.

Suggestions And Future Strategies

After an analysis on the decision context and the problems that each actor faces in such complex and conflictual environment, it is possible to create a first conceptual network. Fig.3 introduces a typical form that gives an idea of the morphological variety of decisional network. The dots represent actors and arrows are their connections which in the analysis model are the resources they exchange with the regarding policy. In these conditions, what remains to do is to open up to various possibilities of strategic choices designed and formulated by a group of authors.
The "art and craft of policy analysis" written by Wildawsky in 1979 and later by R. K. Sapru in 2010, consists in the ability to "read" the decisional processes in order to choose the correct strategy to achieve the transformation desired. In this case, from the analysis, it's clear that a different cooperation and network among actors can totally change the decisional context. To get to different scenarios we must flank again to the theory of complex strategies. Density and Centrality are two indicators that measure the network properties;
The higher the level of centrality, the greater will also be the role of the dominant actor (new connections), whereas the higher will be the density, the stronger will be the relation and cooperation among actors (new interactions). If we should

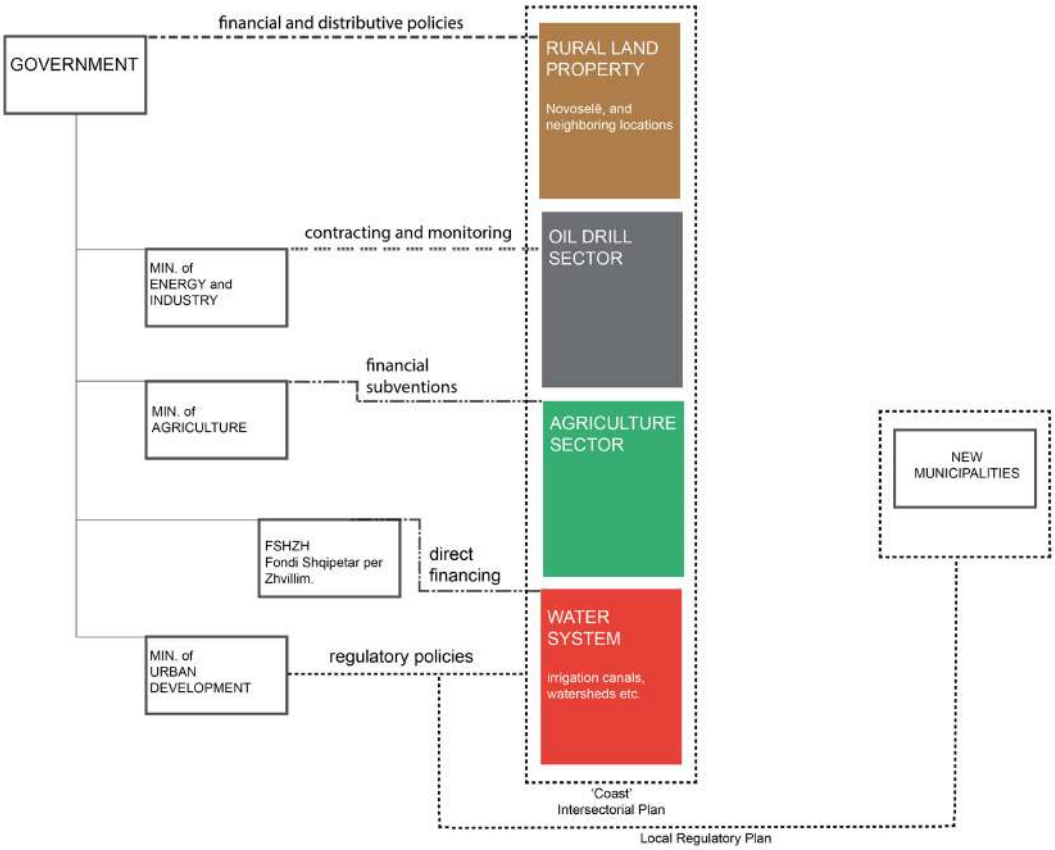


Fig2 / Actors, Public Policies, and Actors Network: sources / 2 initiatives of Ministry of Urban Development (Local Plans, Intersectorial Plan - 'Coasts'. 3 ongoing projects of Ministry of Agriculture (PROMAS, SARED, Water resources and irrigation projects), Governmental initiatives (Ditari i Keshillit te Ministrave - 1 Prill)

ask about the dominant actor, it is clear that the Ministry of Urban Development regulates more connections with other actors, although it's regulatory policies holds the network - the Intersectorial Plan 'Coast'.

In social science regarding network manipulation theories and possible scenarios that can be generated exists a multiscalar and interdisciplinary way in treating actors and their resources. What we are going to do is by imaging a different level of centrality and density for the territorial projects / policies. Indeed for (Coleman, 1956), the existence of multiple centers of power and avenues of status attainment is central ingredient in maintaining the freedom-order balance among actors.

Strategy no.1 Increase / decrease the density
- Objective 1: Increase the density (increase interaction)
When we expect mutual learning (repeated games), and a creation of trust between different actors.
- Territorial scenario no.1: By increasing the interaction among local actors, such as local land owners, local farmers, oil drill company, regional agencies, with the corresponding ministries. Certainly, not all actors have the same resources, but what keeps them together are the financial policies from the central ministries. One solution it would be by seeing how funds are distributed, in order to create a system of continuous game with reciprocal beneficiaries - and this can take place at local grassroots, by empowerment and capacity building approach.
- Objective 2: Decrease the density (decrease interaction)
This example is considered as an expectation when different actors could have different statements or conflictual relations.
- Territorial scenario no.2: One of the possible scenarios can be to address international diplomacy and informal mediations. Certainly, the low density in Fig.3 shows its peculiarities on decisional context on three issues; land property, monitoring and certifications and financing policies - but a similar and continued condition should be put in a serious constriction of the future development of the regional area.

Strategy no.2 Change the centrality
- Objective: Increase the centrality (add interaction)
This is to ensure the stability and

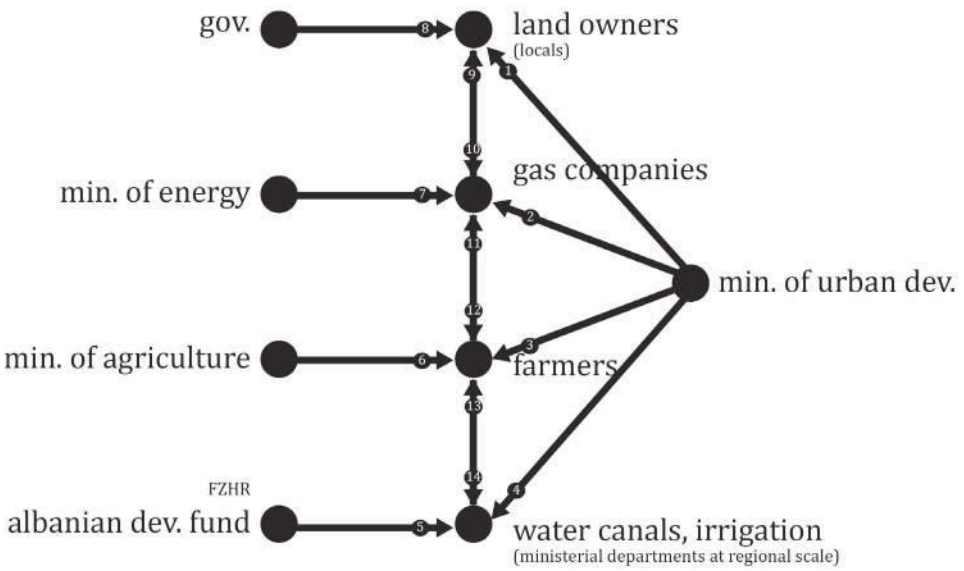


Fig3 / Actors, Public Policies, and Actors Network: Measuring Centrality and Density. (a. Distributive Public Policies - Financing, b. Regulative Public Policies - Intersectorial Plans) source / scheme by the author

Proportion of all the connections in the network that refers to one specific actor.
Its formula is: C = ki/∑ki
where: C = centrality coefficient that varies between 0 and 1
ki = number of connections of each actor

Amount of relations among actors of a decisional process. Its formula is:
D = ∑ki /(n2-n) where:
D = density coefficient that varies between 0 and 1
n = number of actors
ki = number of connections of each actor

effectiveness of the main actors (not necessarily efficiency).
- Territorial scenario no.3: The ministry of Urban Development is the only actor which has the highest interaction with the other actors, and the regulatory policies (Intersectorial Plans) are the resources that this actor has. By adding new interactions with other actors, such as other various ministries, we can integrate the financial resources with those regulative - which would lead to new territorial Plans. At this point we must add that the final result may be also collegial groups among the actors.

Final remark: the study of the network and the possibility of manipulating the interactions between the actors does not bring great reveals in the aspect of the decision making, but rather it offers a clear analytical field of present territorial policies and those that possibly could be taken in consideration for future strategies. On this frame, new strategies can be added.

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Approach to an adaptive methodology for reading informal structures / The approach of reading informal settlements for the recognition of small typological study cases of intervention for retrofitting surrounding areas

keywords / methodology, anthropological processes, cataloguing, heritage, compositional principles, cultural planning strategy

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Abstract

"Most cities in Asia and Africa that have a pre-colonial existence, also have some or all of that original settlement largely intact. [...] In many instances, the original city is separated from the more modern city by its old defensive wall (for example, in Lahore, Pakistan) or a moat, or it is on a hill (such as Salvador, Bahia, Brazil), and often has a distinct name, such as the kasbah (for example, in Marrakesh, Morocco) or the old city (as in Old Delhi, India). It is a distinct neighborhood or even a sub-city within the city"
"Un-Habitat, The Challenge of Slums - Global Report on Human Settlements, London Earthscan, 2003."

This paper discusses a specific integrated methodology for the retrofitting of the historical centers in quick developing countries. This will enhance the use of new technologies for the cataloguing of existing objects and the urban planning, also involving in the process the local population as much as possible, attempting to iden in declaring that this is an integration between already used processes (as cultural planning strategy) and other ones that exist only in literature (as the improvement of BIM systems with heritage soft-details).

Introduction

In the present moment Global South countries are passing through a very quick development, where one of the main risks that could occur relates to their heritage centers, firstly becoming new slums and then devoured in metropolitan centers. This tendency, also written in the same Report on Human Settlements, emphasizes the inner part of the city being subject of ownership disputes, bringing difficulty in the refurbishment or in the redevelopment of the old city areas. Hence, these areas represent part of local cultural heritage and generate claims of conservation, competing with diffused demolition and modernization.

"Their strength also lies in their location within the city and in relation to the centers of commerce and production. The easy access to employment, real and potential, combined with cheap if rundown housing, are natural magnets [...]"
"Un-Habitat."

From the postwar period, many modifications overtook urban settlements, inside and outside Europe with lot of structural changes in the spatial dimension - the developments of contaminated areas, obsolete places, dismissed structures – as the socio economics one – unemployment, marginalization and alienation. Trying to face the consequences of heavy industrialization, some of these cities have managed the change, sparking the processes of growth and diversification of economic activities, more and more geared to services and new technologies for the creation of a favourable business environment, often supported by macro-

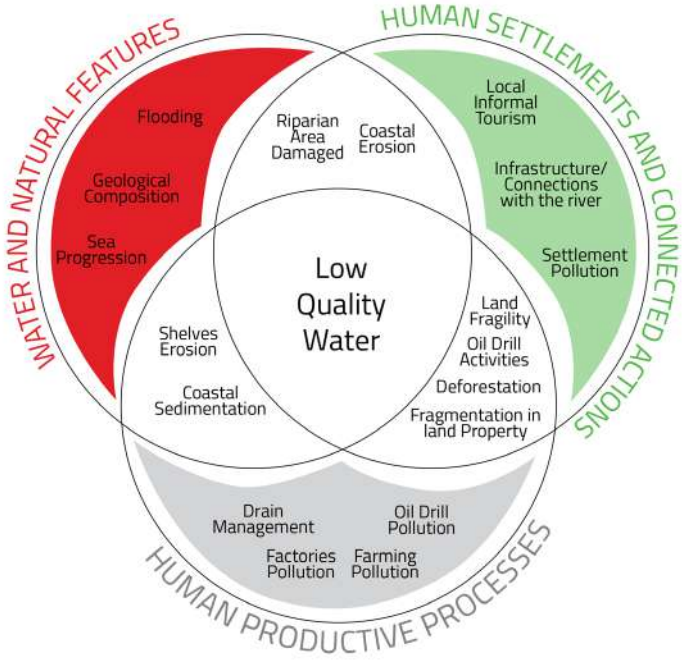


Fig 1 / Example of problem scheme developed during the workshop
source / PhD students drawings during the workshop

economic policies and flexible regulations. This happened mostly in Europe during the second half of the XX century.
Municipalities, researchers and inhabitants have understood that there is a true necessity to refurbish, recover and most of time adapt existing buildings, transforming them into "functional buildings", instead of creating new. The risk of producing new structures in the city without taking in consideration the old one has also an impact in the deterioration of the micro economy of those areas.
Recently the identification of possible - better paths for the retrofitting of heritage centers in developing countries is becoming one of the most important topics all over European research centers.
Most of the times it is possible to find this process of conversion into slums and then imposition of forced development to transform them into big cities. As a proof that this is a diffuse trend, it is possible to define worldwide this typology of process: Singapore is one of the cases. Since 1965, the year of the expulsion of the city from the Malaysian Federation, it has been converted from a socialist to a "productive and modern" new center. In "Kuan Yew Lee, The Singapore Story : Memoirs of Lee Kuan Yew. (Singapore Press Holdings, 1998)." Dr. Lee Kwan Yew, leader of People's Action Party, stated:

"We believed in socialism, in fair shares for all. Later we learnt that personal motivation and personal rewards were essential for a productive economy"
Quah, J. S. T. (2010) Public administration Singapore-style. Emerald.

Quah, J. S. T believed in the sense of "ownership as vital for a new society", which had no deep roots in a common historical experience. This maybe could be right in a society that can handle the challenge of preserving a heritage of knowhow and local knowledge. But many times the renovation is a chance to increase productivity without a real purpose in the preservation of historic heritage. Thus in 2011, eleven year later, this need of preserving the heritage sites in Singapore came out thanks to Mr Mah Bow Tan, the Former Minister for National Development in Singapore. He underlined that making the economy competitive and globally recognized is one of the most important things.

"We need to conserve our urban heritage, because it contributes towards a greater sense of history and identity, and helps to preserve the soul of our city, making Singapore a special home for our people."
Extracted from Foreword in Lily. Kong and Urban Redevelopment Authority (Singapore), Conserving the Past, Creating the Future : Urban Heritage in Singapore (Urban Redevelopment Authority, 2011).

The significance of this example stands in the potentials of countries undergoing big development, such as Singapore during the middle of 1960s, Albania since the past two decades, or India since 1990s. Nevertheless, it is essential to monitor and take advantage of the possibility, though in the right way: the risk of loosing important heritage elements that carry a part of local knowledge and vernacular

lifestyles. Vernacular here should be defined as "local style in which ordinary houses are built", but also "dance, music, art, etc. that is in a style liked or performed by ordinary people" (Cambridge Dictionary, Cambridge University Press, 2016).
In this way local urban housing and ancient precious architecture constitute a living context, a living technology and a morphology, that has to be preserved and adapted to meet the quickly changing needs. Due to the lack of any protective measures and the pressure of urbanization, demolitions have been carried out, fragmenting particularly the inner part of the cities. The protection of a city as a whole is under the guidance of urban management and cannot be limited just to the creation or the implementation of new kind of economies.

Until this moment most of the new projects inside developing cities are trying to imitate the western model, without preserving any kind of historic and local know how or constructive methodology. For instance this is very much evident in Ahmedabad, one of the most developing cities in north west of India where the city center heritage is trying to protect itself from "extraneous wrongly westernized constructions" that are growing very close to the two most famous streets of the historic center (Gandhi and Relief roads), somehow resembling some of the "turbo-architecture" of the Albanian coast. As a result, the issue that is increasing stands in the changes occurring in the inhabitants' lifestyle, becoming more and more westernized.

Research purpose

The purpose of this article is to study the possibility of using innovative cataloguing systems, in order to find a way to initially understand and classify the heritage sites. The quick spread of social networks as a meeting point for exchanging feelings, sensations, ideas and suggestions is leading to a common discussion on different subjects. Usually it is difficult to find a real estate registry for the city in quick development, whereas the implementation of this technology could be the base of sharing knowledge, in order to identify problematic areas or overpopulated districts. Happening in many European cities, the discussion of the municipality and the cultural corporations with the inhabitants stands in a crucial point in understanding their needs and suggestions.
Thus, the consecutive action shall be trough this "understanding methodology", identifying guidelines to follow retrofitting-requalification-renovation of the analyzed areas. This calls upon the preservation and enhancement of the heritage. The challenge in doing this is to maintain traditional lifestyle but meanwhile improving inhabitants' wellness and the healthy conditions.

In the first phase there is need in classifying the information from the social networks regarding the case study (the examined city or area) by density/structure/archetypes, quite a different approach of the analyses regarding other European cities. The comparison is impossible due to the way of living spaces of different cultures, or with the study of initial urban settlements born in many different ways and - of course - the different evolution. It may be easier to analyze these "generator archetypes" in Europe, where most cities hold on to a roman's structure based city.
The original settlements in developing countries were usually conceived in an organic way: this means that on a first aggregation of houses or around a nucleus (as a Fort or a Castle), some houses were initially built, and then others followed, without a precise urban development planning. The same has happened in "vertical" stratification of houses: near by the nucleus of the old city where the density has grown without specific rules on the possibilities of increasing floors/projection on the street. Different layers in the same house coming from different historical moments give the stratified shape of the city. Although the previous research regarding old city's structure, the challenge stands in finding the right inclusive way in understanding which one is a superfetations (encumbrances, discontinuities in this unitary structure) and which one is not. The discernment has to be done understanding the outlier's buildings: one of the most common example is the one of colonization, discussed in the next chapter as a good practices adopted by many Asian municipalities, understanding the "outliers" in the heritage city structure.

Understanding composition

Origins and age of the historic centers indicate the legacy of a city, such as its physical asset of heritage building, the root and the speed of its growing, as the different cultures that came and let signature on the urban fabric. In this vision, it is essential to identify which are the most important/common/ancient archetype that have influenced the city and the local culture, in order to understand better the contribution of every architectural era.

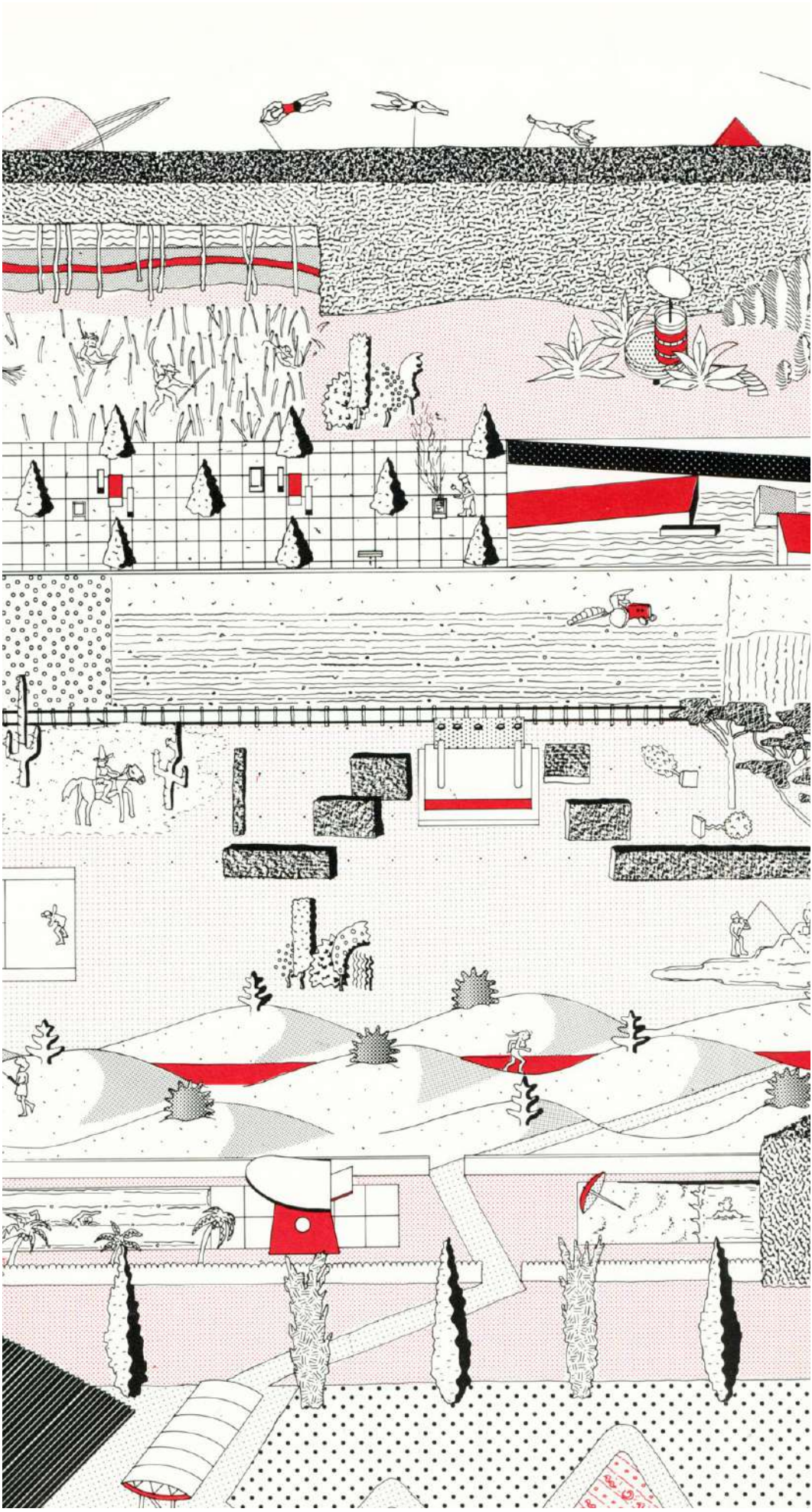
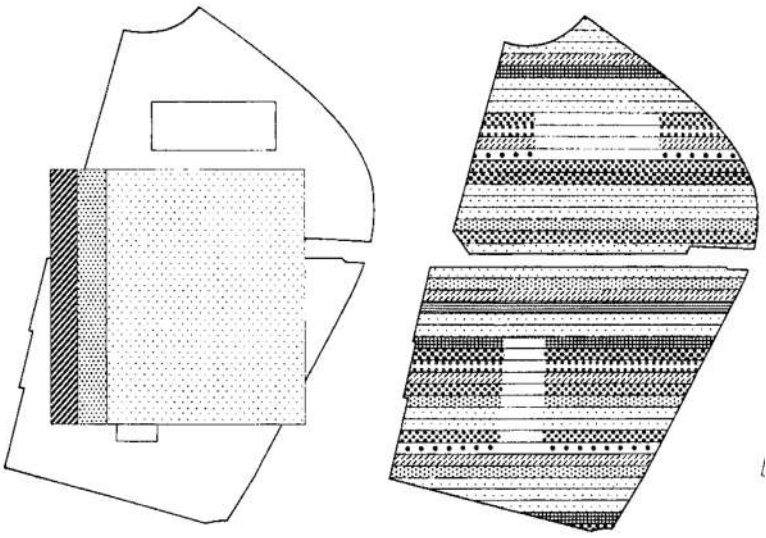


Fig2 / Visual representation of the overlaps of different layers of Rem Koolhaas project for Park de la Villette in Paris / source quondam.com/19/1982



Initial hypothesis (scale: 1/20,000) *The strips*

This has to be done in order to outline a scheme of the influencing periods, at an urban and architectonical scale. In this part the example that we will focus on is the colonization's influence in Asian countries. The reason upon this choice is the evidence in these countries of the difference between the pre-existing buildings (from the structural part to the decorative one) and the new ones created in the colonial period, that most of time have been abandoned.

The imposition of different detailed rules for the creation of architecture in some colonial cases was not every time positive and this is evident in the housing areas. Mostly in Asian colonized countries this concept is visible: in the city center, where the compositions of a colonial house do not follow the local housing requirements, it is possible to find dismissed or abandoned structures. The sociologist Giandomenico Amendola, in his book "Giandomenico Amendola, Uomini E Case : I Presupposti Sociologici Della Progettazione Architettonica (Edizioni Dedalo, 1984). P. 50" says that

"The house has been defined as 'symbol's made shelter', which express the identity and the relationship with the future and the destiny, as the social status"

In this idea it is clear that a non-coherent structure inside a city context (also if it is semi-defined, but with a common historic background) can be refused or rejected by the inhabitants. For example there are many cases of 10 floors buildings next to stalls or normal houses. Otherwise the presence upon ancient houses (that needs a restoration to not collapse and be maintained) of other volumes, adjunctive floors, generally without the sense of local and traditional architecture. Just as an example, it's possible to identify most of the times in Asian countries, inner courtyards of houses, very similar to the ancient roman's houses, used to refresh the nearby rooms and cells. As well as the position of the kitchens: it was planned in a central position for the sight from there of the street and of the courtyard. All these unwritten rules have to be catalogued and therefore the requalification has to take into account all this kind of knowledge in the creation of the rules for the revaluation of the both historic centre and new developments. Therefore, it is important to identify the compositional and constructive rules and convert them into an innovative production system that will lead on to the creation of a new class of specialized artisans.

The two actions needed to deal with the problem of loss of intangible and tangible heritage are the following.

Cultal planning strategy

Over the course of fifty odd years it has become clear that development projects "are most success- full when they are low-cost and small in scale, when they respond to the needs of a specific target group and involve the beneficiaries themselves in the planning and implementation process" (Smillie, 1991: 114). In short: architecture alone cannot solve people's problems - no

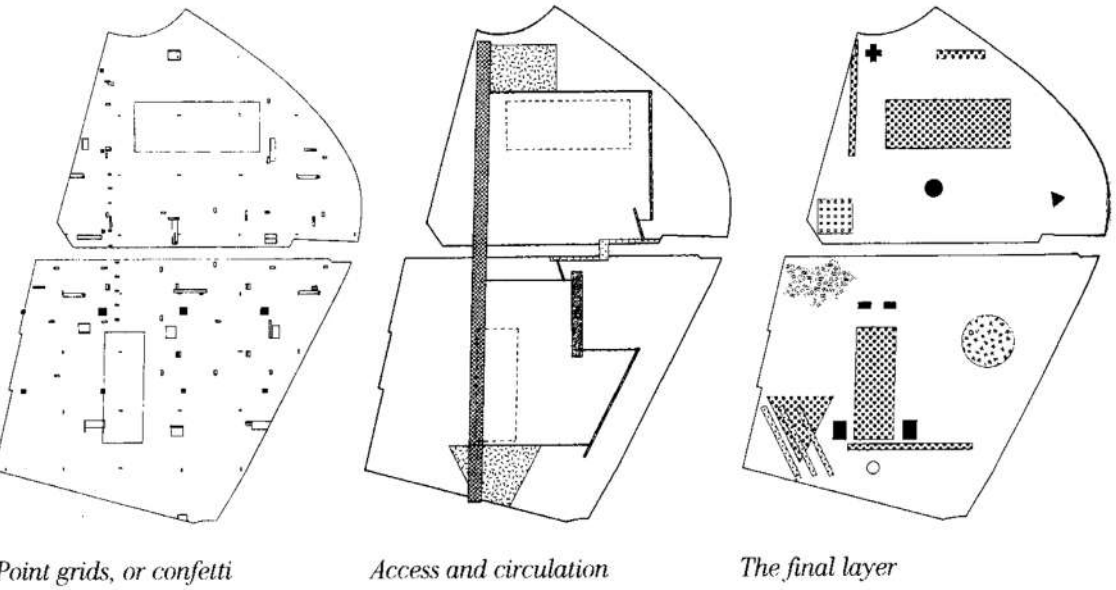


Fig3 / different layers for the study of the project of Parc de la Villette by Rem Koolhaas source / oma.eu/projects/parc-de-la-villette

matter how well intentioned nor sensitively designed. If architecture is to successfully address the needs of those on the margins it must address what we will refer to as the organizational dimension.
Morgan M Carter, 'Architecture and Social Change in the Development Era', 1992, 6–20. p. 3

One of the actions that it is important to follow is the creation of a cultural planning strategy, that has as main target the valorization and the enhancement of the cultural resources – cultural goods, environmental protection, cultural events, typical productions through the activation of cultural offerings. It is possible to count some of this actions in developed and developing countries that have been a big success world-wide: the case of Malmo in Sweden, or the one of New Gourna in Africa directed by Hassan Fathy, or Diebedo Francis Kere for the construction of School in Gando, Africa. (Corrado. Trombetta, Rosario. Guiffrè and Hassan. Fathy, L'attualità Del Pensiero Di Hassan Fathy Nella Cultura Tecnologica Contemporanea : Il Luogo, L'ambiente E La Qualità Dell'architettura (Rubbettino, 2002).; Hubert-Jan. Henket and Hilde. Heynen, Back from Utopia : The Challenge of the Modern Movement (010 Publishers, 2002).

The cultural planning strategy has to optimize the economic and social impacts through the trigger of activities as the human resources, territorial infrastructures (for example transportation services for tourist and commuters), companies which valorize the local productions and creation of resources (as companies of restoration, cataloguing, multimedia, touristic, etc.).
A cultural planning strategy identifies, through negotiating processes, the path for the cultural development, in relation with the heritage safeguard. There are many ways for the implementation of this kind of strategy but every one of them follows the path of a first analysis on the cultural and economic main issues and the subsequent creation of focused groups with the stakeholders on different fields. Thus, for the groups is mandatory to find together a feasible solution for the initial problems.

At the end of this phase it is possible to collect all the possible proposals and create a final document to summarize all the suggestion and make them talk to each other in an organic dimension. The third phase of the cultural planning strategy is the one that concerns the intervention of professionals from the sociological, planning and architectural fields. This stage is the most important one in order to create a functional planning by all the points of view and it concerns in a pre-planning phase and the creation of the active planning team.

In the pre-planning the target is to examine the feasibility of the proposal and talk with the cultural representative, most of times trusts or municipalities, about the costs of the requalification operation. At the same time, it is important to emphasize dialogue due to the fact that stakeholders (inhabitants and economic

and political leaders) could understand the importance and the positivity - of economic and social investment - of every action that will follow. In addition on this first phase the scientific committee has to understand the administrative body that will follow the operation: most of time the municipality will be the chosen one who will follow the creation of a detailed development plan of the cultural planning strategy. The presence of the municipality as the coordinator of the operation should ensure in the process the involvement of the inhabitants and the public representative bodies.

It is impossible in a cultural planning strategy, to avoid other factors as the geomorphology of the area, which most of times have historically influenced the production or the settlements in the surroundings. Therefore, in order to better understand the zones where it will be possible to work on, at an urban scale, it will be necessary to catalogue the natural slopes, hills and mountains. All of them will have important influences on the vision for the future use of that area, to make the geomorphological aspect fit with the human function, based on the requalification principles. Some of the possible divisions that can be leaded on for discerning the intervention areas and intersecting them with the human settlements are the followings.

Water and Natural Features: the elements of this group most of time do not / cannot be touched. For example the sea progression/coastal erosion problematic for some areas that cannot be solved on its own, maybe can be blocked with some intervention to repair the coasts, as the creation of quays at a certain distance from the coast itself.

Human Settlements and Connected Actions: It will be possible to work on these elements. However, there is the need of a distinction between informal and legally recognized elements. In this group aiming in categorizing the problems connected with the informal constructions that do not follow any kind of regulation, condoned without legal declaration. The main problem of this kind of aggregations comes from the inhabitants', the lack of primary services in the area and from the municipality side of not being able to have control and planning on.

Human Productive Processes: the last group that we can have is the settlement aimed to intensive production that we can identify as "secondary sector". The main problem for these areas are close to the previous case: when the settlement is informal, the issue is the primary urbanization. Usually both legal and illegal areas are afflicted by the pollution production problem together with a lack of garbage management.

Technological tools

Is possible to identify, in many places of the Global South, the hesitation of the inhabitants towards the trusts and municipalities. The attempt for renovation and the one for globalization that has involved mostly during the '70s and '80s produced a relevant drawback for certain countries: the loyalty from the inhabitants to the public bodies decreased because of the different willingness of the two parts. From one side the population wanted to increase its wellbeing and lifestyle. On the other hand, the first thing that the Trusts and Municipalities tried to do, focused on tourism profits, from opening of the new and international tourism routes (Rabindra. Seth and Om Gupta, Tourism in India : An Overview (Kalpaz Publications, 2005). In some cases, this kind of deployment willingness from the public and semi-public body's raised the discontent from the poorest part of the population: in their opinion the firsts tasks was to undertake healthcare, education and other fundamental ones. Nowadays the consequence of this wrong policy in many places is the gap created between the citizens and the cultural places as museums/cultural institutions/ municipalities. Authority that manage this kind of policies – as Trust, still wonder how they could bring back inhabitants to their places with different kind of actions: some workshops that involves together Trusts, Municipalities, Universities and inhabitants; setting up of meetings and discussion on the possibilities with citizens; the creation of new aggregation points and events to make the youngest be involved in this process of renovation. (cfr. K. C. (Kallidaikurichi Chidambarakrishnan) Sivaramakrishnan, Re-Visioning Indian Cities : The Urban Renewal Mission (SAGE Publications, 2011); .M. (Masahide) Horita and H. (Hideki) Koizumi, Innovations in Collaborative Urban Regeneration (Springer, 2009).)

So nowadays, a lot of Trusts and Municipalities have to re-establish a loyalty relationship with the inhabitants. This can be possible also by using innovating technologies as web portal, online questionnaires and other informatic

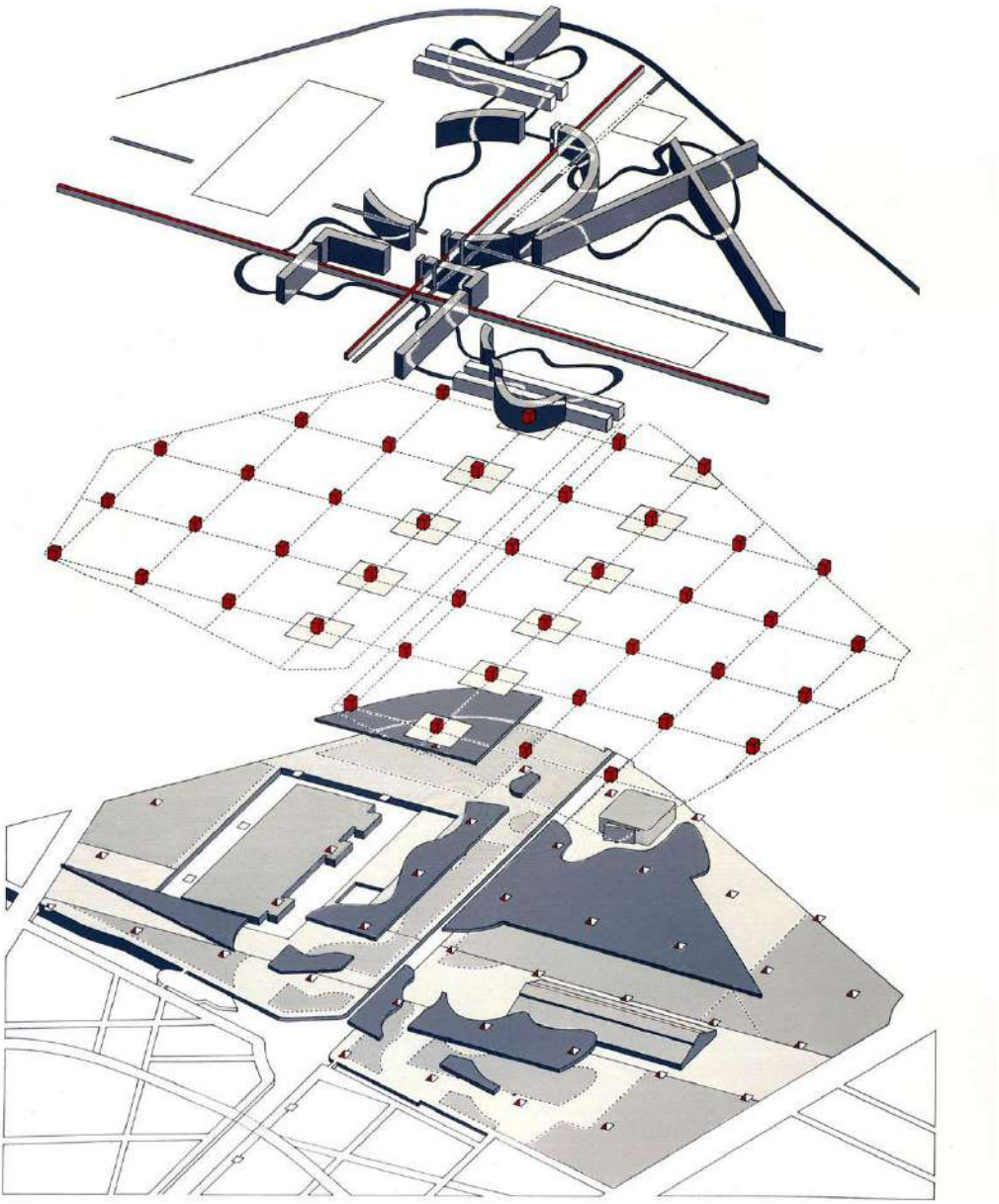
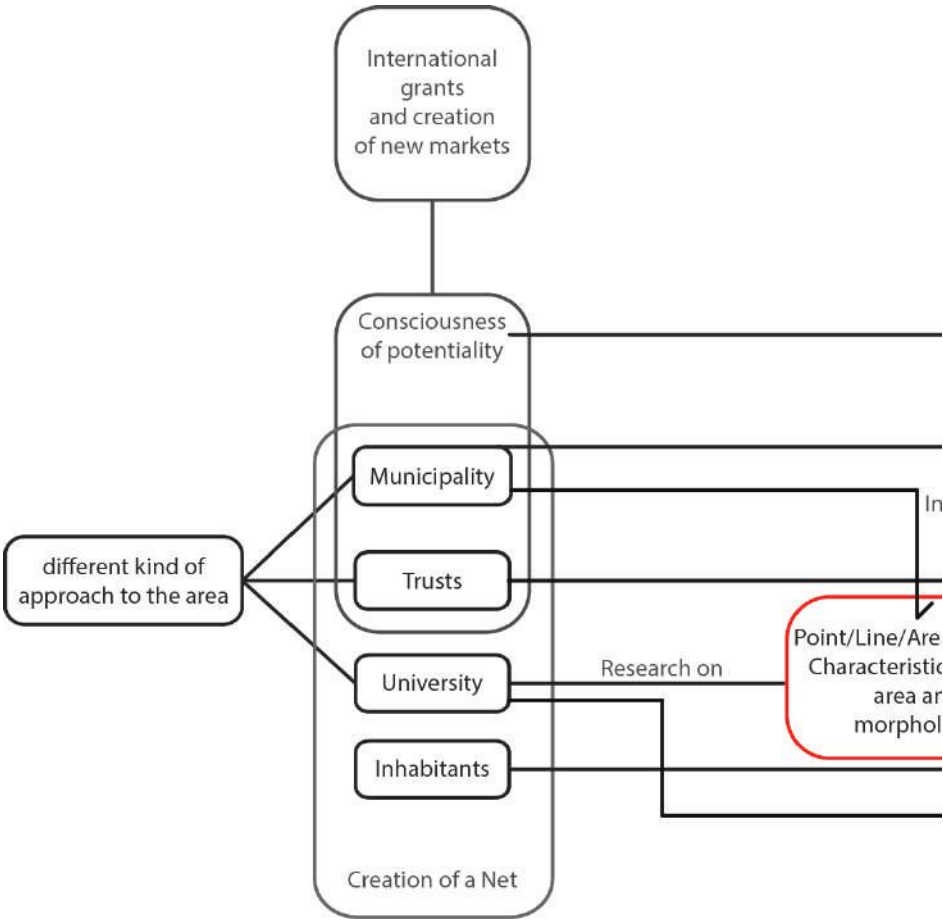


Fig4 / The usage of the points-line-area theory to individuate the right layers inside the project of Parc de la Villette by Rem Koolhaas / source tschumi.com/projects/3/

but user-friendly tools. Many governments are improving financial funds in order to digital empowerment of the development countries (one example could be India: cfr. Digital Empowerment Foundation | Annual Reports <http://defindia.org/annual-reports/>. Nevertheless, after that there is another challenge that comes up: the cataloguing of all the surveyed information.

Maybe is it possible to find the answer to this task in the identification of the right technology, as GIS or web-BIM based platform, establishing very quickly the processes of reconstruction and cataloguing, inclusive and user-friendly. In the social era is not possible to avoid the possibility to accumulate big quantity of information and include in the process of data collection the common users. They will feel involved and included in the process. Just to make an example of a campaign that can be developed for the involvement of the citizens could be the census one: in this part, every citizen can catalogue the problems that they find in their houses and in the nearby areas through questionnaires including here essay question and multiple-choice answers. Another possibility could be the creation of maps with an easy interface or geotag photos that show problems. With the help of statistic instruments, this will lead the scientific coordinators to the identification of the main problems inside the city/countryside structure.

Another one can be inside the culture survey: it will be possible to find and to upload all the expositions and the possibilities for the inhabitants to expose their manufacturing works inside the public spaces and all the exhibitions that



will be leaded on by the many different Trusts.
Nowadays the BIM (Building Information Modelling) technology is the most useful instruments for collecting data's in all ranges: is possible to insert information about the zoning reports and rules, to the architectural details and construction methodology/technology. The potential of this is the monitoring of all the information concerning all the development processes, requalification, events, and temporary roadworks.

The BIM database will be useful for two important reasons: the possibility to add a lot of information on the morphology and the composition aspect of the architecture in all the different scales as a chance to check the model with assigned rules. This means that from an urban to a technological scale there are modelling software's that allow technicians to be guided by scientific supervisors ensuring that the model pursues the set of rules. The rules are the ones developed during the creation of the cultural planning strategy.

Conclusions

There is not a unique and certain solution to the problems involved in the adoption of a development planning system as previously described, which contains a deep control of the heritage centre of the cities and a density survey in the country yard. Nowadays, most of the steps that are elaborated in the proposed methodology are in a debate involving Universities, Municipalities and Trusts, also different countries. (Carlos Nunes Silva, Citizen E-Participation in Urban Governance: Crowdsourcing and Collaborative, 30 Giu 2013 (IGI Global, 2013)). In fact, some of the stages, as that of cultural planning strategy or the use of web-BIM integrated technology, are amongst the best methodologies and instrument that make the population and the authority discuss in a bivalent dialogue.

The work in cooperation within the citizens, the trust, municipality, and stakeholders groups involved need to improve and join the discussion regarding cataloguing campaigns in order to reach a new shared and mutual approved regulation plan for old cities and new developments. This will be a regulation that has to include all the factors and characteristic of the ancient city, as the urban and architectural density, as the well living spaces need to maintain and renew some heritage areas, with the introduction of different functions

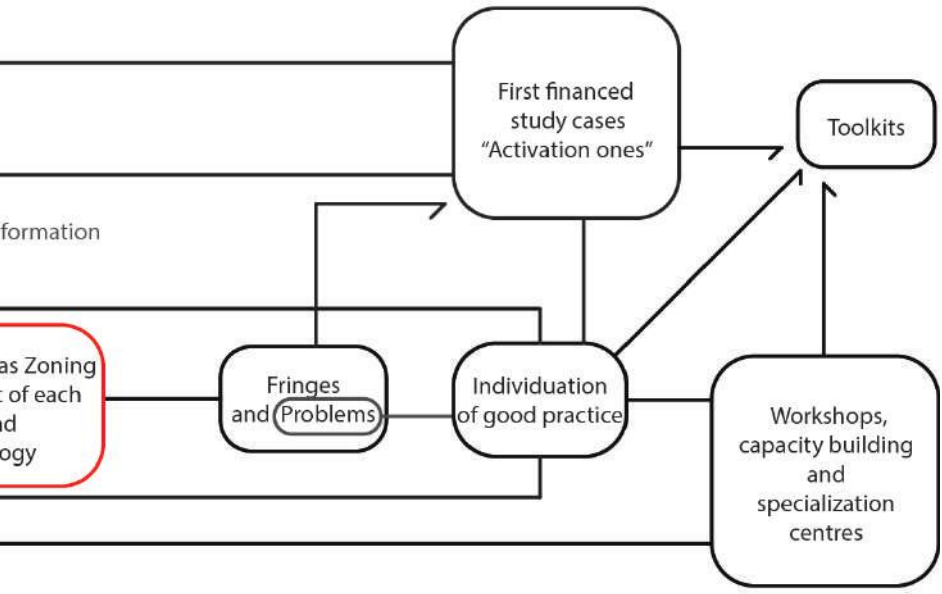


Fig5 / General scheme of the methodology
source / drawing by the author

that are not westernized, but that come from a common study on the refurbished traditional know how.

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Building Resilience in rural areas / A balance between environment, small settlements and their productivity

keywords / rural resilience, sustainable development, eco-systemic land use, local resources, traditional construction techniques

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Abstract

Today's world is going to face a wide spectrum of changes. Since the status of crisis is increasing in many countries, governments are recognizing multiple aspects of the problems they need to face, starting from the financial market crash, to the environmental degradation. Even if rural areas have always been a good example of simultaneous coexistence of natural ecosystems and economic and cultural functions, they often present the worst condition of decline in all of these sectors. It is obvious that a strategy for facing these changes is needed, but still referring to landscape only is not enough, given the complex character of the rural areas. Starting from the definition of rural resilience, this paper further focuses on this concept, by exploring the role of vernacular architecture as part of the sustainable development process of a distinctive contexts.

Introduction

Rural areas occupy the main part of the global territory and host approximately 50% of its population. Agriculture and forestry are the main land covers on these areas, and they play a key role in the management of natural resources and in determining the rural landscape (EC, 2009). Despite this, there are no real definitions on what a rural area is, if not just as the opposite of what an urban areas is: "whatever is not urban, is considered rural"[1]. Moreover, planners and politicians often forget the importance of the good management of natural resources: policies usually have large environmental impact in terms of land uses, landscape changes, environmental pollution and biodiversity loss, but also large economic impact in terms of changing demographics, reduction on agricultural employment and diversification of the rural economy (Schouten, 2009). In return, there has been a growing tendency favoring the scientific study of landscapes, more as a natural resource, than as a cultural phenomenon. According to Carl Sauer[2], most of the inland scenery, especially in the Mediterranean basin and in many densely populated areas, has a cultural origin that is indissolubly tied to farming, forestry and grazing practices, as well as the environmental conditions changes. Alberto Magnaghi's statement, defining the territory as "the biggest and coral artwork ever created", helps once more to discover the deep and silent bond between landscape and the natural, economic and cultural systems. A complex set of ingenious and diversified techniques of human settlements on the territory has contributed to the survival of population and the construction of a new heritage, where quantity and quality of human transformation define the land value. However, the current interpretation of landscape metrics refers to units, which are characterized by a certain degree of homogeneity, concerning natural conditions (geology, morphology, soil and climate), or even land uses. Unfortunately, a harmonized system of landscape unit does not exist. For this reason, the need to promote and implement conservation and valorization of cultural features of the

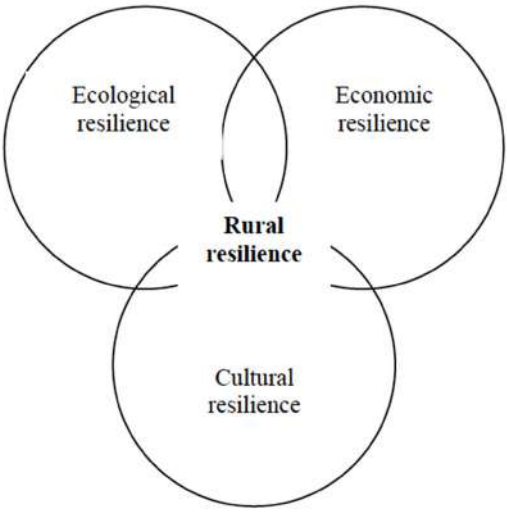

Fig1 / Rural resilience: all in all, reducing resilience – be it economic, ecological or cultural – increases vulnerability, exposing rural systems to greater risk of uncertainty and surprise. As a result, building resilience should be part of the agenda of rural spatial planning and design . source / Heijman et al., 2007

rural landscape, is especially important in Europe (Agnoletti, 2014).

Resilience as a principle of rural area's defence

The capacity of a system to face changes, to absorb disturbances and re-organize itself, so as to still maintain essentially the same function, structure, identity and feedback (Walker et al., 2004), is defined as resilience. This concept was first introduced in 1973 by the ecologist Holling, and ever since its application field has been enlarged from biology to literature, psychology, economics and sociology, until its recent exploitation in the study of uncertainties and rapid changes of rural areas. The rural resilience theory is based on the idea that ecological, economic and social systems become increasingly interleaved and the interactions between these systems are growing in intensity and scale (Heijman, 2007). Rural area can therefore be termed as a complex social-ecological system (SES) (Ambrosio-Albala et al., 2008), where rural landscape represents the continuous adaptation to difficult environmental conditions, providing products and services, contributing to the quality of life of its inhabitants and producing landscapes of great beauty[3]. This concept of resilience provides a fresh and useful perspective on sustainable development[4], increasing economic growth with social responsibility, including respect for human rights and traditional cultures. Both resilience and sustainability deal with the future, and it makes sense to think about resilience as a conceptual basis for sustainability.

Because the future is unpredictable and uncertain, it is important or even essential to explore the resilience of a system by identifying its components and their interaction in a dynamic way.

1 / "The Health Resources and Services Administration of the U.S. Department of Health and Human Services defines the word "rural" as encompassing [...] all population, housing and territory not included within an urban area." ["Defining the Rural Population". Hrsa.gov. Retrieved 2013-04-25.]

2 / "A cultural landscape is fashioned from a natural landscape by a culture group. Culture is the agent, the natural area the medium, the cultural landscapes the result" (Sauer C., 1925, p. 343)

3 / Rural landscapes are linked to agricultural practices and traditional knowledge, defined as "complex systems based on ingenious and diversified techniques, on local knowledge expressed by rural civilization" (Ministerial Decree n. 17070/12, Italy).

4 / In 2005, the three pillars of sustainability have been defined as follows:

- *Environmental: the human capacity of intervention in order to decrease and even avoid negative impacts on the environment. Human intervention is able to integrate nature and bioclimatic features, to control the production of pollution and waste, to preserve health and prevent from natural hazards impacts.*
- *Socio-cultural: the sense of belonging, of identity, of personal and community development. This scope tries to gather all social and cultural positive impacts observed on vernacular heritage. It concerns the protection of cultural landscapes, the transmission of construction cultures, the capacity to stimulate creativity, the recognition of cultural values (tangible and intangible) and the reinforcement of social cohesion.*
- *Socio-economic: the capacity of reducing the efforts invested during the construction process, the building performance, the maintenance of buildings and all the impacts that contribute to an improvement of living conditions. Here, the concept of effort and work replaces the idea of cost, specially in contexts where no capital-intensive systems were implemented. Vernacular solutions encourage autonomy and local activity, optimize construction efforts, extend the lifetime of the building and save resources. (United Nations General Assembly (2005). 2005 World Summit Outcome, Resolution A/60/1, adopted by the General Assembly on September 2005. Retrieved on: 2009-02-17).*

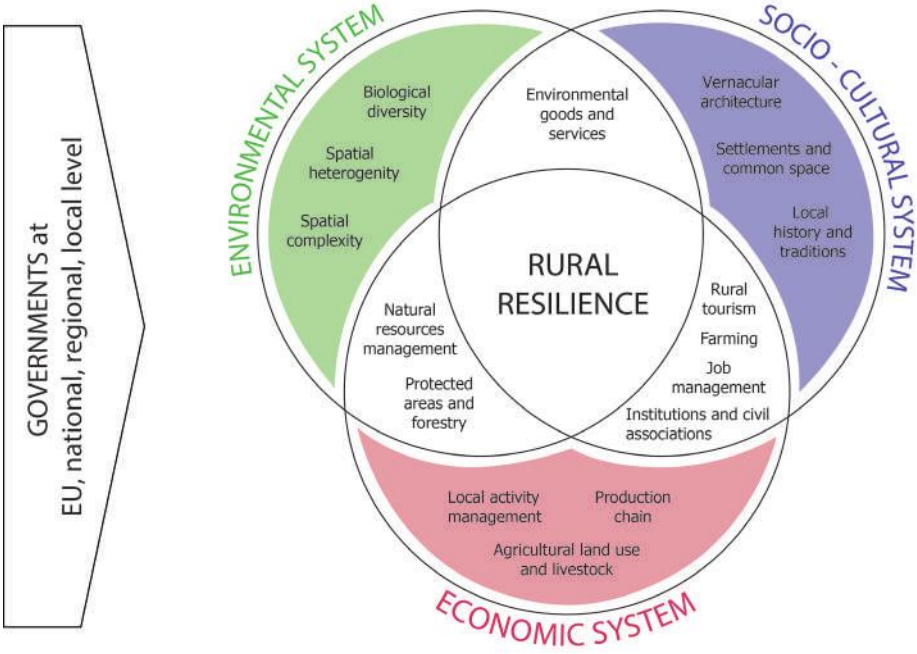

Fig2 / The three pillars of sustainability and their components. The government is treated as being externally influencing the system components: a good management of the whole structure, which considers also the variables in between, makes rural resilience possibile / source drawing by the author

Defining good planning for rural areas

Rural areas typically face a wide spectrum of disturbances. Disturbances on the resilience of one system can affect the resilience of other systems. If the ecological sources of a rural area would not be resilient, the conditions for ensuring ecosystem services, landscape services and agriculture development would deteriorate, and as a result the vulnerability of the site would increase (Schouten et al., 2009). Therefore, starting from the geography of a place and its characteristics, we can find different factors of both natural and anthropological systems, that generate analytic indicators for the definition of sustainable growth. An example of good planning is summarized in Fig. 2.

Although socio-ecological systems (SES) are self-organized through a large number of abiotic and biotic variables, the most important changes can be understood by using a small amount of them. As proposed by Walker et al. (2006), the ecological system components have slow-changing variables, whereas the socio-economic components mainly have fast-changing characteristics. Therefore, system managers must focus on the few variables keys, operating at different scales, with slower and faster rates in time and space. Defining a regional specialization of a rural area in terms of service clusters (agro-cluster, rural services or natural reserve) can be the first strategical step to promote resilience in land usage management. Furthermore, the control of soil consumption, land security and maintenance, reuse of brownfield sites, and adaptation to climate changes, constitute primary of interventions, which define strategic frameworks, programs and assessment tools that integrate climatic, energetic and environmental issues. These actions can be better pursued on a local scale, correlating mitigation (designed to contain future climate changes) and adaptation (aimed at reducing vulnerability to climate change impacts) strategies.

A sustainable lesson from vernacular rural settlements

Rural settlements are often fulfilling the principles mentioned above: with fewer than 50,000 inhabitants, they are able to apply environment-friendly policies, encourage autochthonous production and seek a compromise between modernity and tradition that improves the quality of life of its citizens. The most prevalent indicators of an adequate coexistence with environmental conditions are:

- the settlement morphology,
- the spatial layout of vernacular buildings[5],
- and their relation with natural resources.

This can moreover activate self-reliance, care of basic needs and promotion of eco-development, such as growth of local societies, respect for differences and cultural specificities, the identification of ways of living based on new principles, which achieves self-determination, the production of wealth referring to the territorial values, achieving eventually ecosystem balances at the local scale. Socio-cultural identities play a crucial role in terms of reducing vulnerabilities

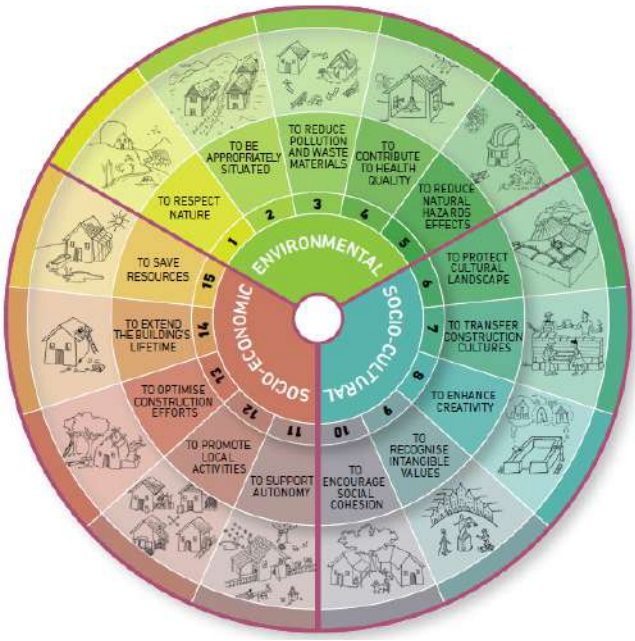

Fig3 / Wheel of environmental, socio-cultural and socio-economic sustainable principles, referred to architectural design. 15 principles that established a wide number of strategies to consider and to integrate in contemporary sustainable architecture / source Correia et al., 2014

and strengthening the resilience of the communities: the indigenous culture is important since it includes the knowledge of management of the territory in an appropriate way, which usually is indispensable to prevent natural disasters. Last but not least, the economy of rural settlements, closely influenced by the climatic and biological charateristics, is strongly linked to the environment, or else to the locally available physical and human resources. Self-sufficience is therefore the most essential precondition for a community to be socio-economically resilient (Dipasquale et al., 2014). An approach that promotes landscape peculiarity and anactive empowerment of local istitutions, contributes to the production of new common wealth.

Vernacular heritage as part of the socio-cultural system (see Fig. 2) addresses the local context, in terms of employed buildings materials and typical construction techniques, which both reflect the historical background of the population, and provides a good comfort. Sustainable architecture (or resilient, as defined until now), as well as sustainable rural planning, should strongly refer to vernacular buildings as an example of climate responsive design with low environmental impact, able to protect territorial quality, through social relation in balance with the surrounding. Taking advantage from the VerSus Project's results, published in 2014, after a three years research around the value of the vernacular heritage in the Mediterranean area, we can define sustainable architecture, when responding to the mentioned 15 principles (see Fig. 3). This synthesis is very important for providing the possibility to outline the conditions of existing heritage and to be able to restore it (if needed), or to build it ex novo, respecting the genius loci[6] of the place (VerSus operative approach). Vindication of sustainability in architecture, attempts to equilibrate this dialogue between the natural and the artificial system, and to define architecture as "a fragment of built responsibility"(Dischi, 2008).

Unfortunately, today the building sector mainly uses industrially produced materials. These are characterized by high energy consumption, high carbon emissions and high energy-intensive production processes. Because of globalization, they are extracted, processed and distributed globally with considerable transport costs and environmental impact. Their applications usually do not maintain a close relationship with local traditions,

5 / The term vernacular commonly refers to 'traditional' or 'popular' architecture, as opposed to 'scholarly' architecture. From a theoretical point of view, Paul Oliver (Ibid.) refers to Rudofsky in his definition of vernacular architecture and retains the notion of popular architecture, architecture without architects, or even 'people's' architecture (Oliver, 2003), expression of an "indigenous science of construction"(Oliver, 2006).

6 / In the context of modern architectural theory, genius loci has profound implications for place-making, falling within the philosophical branch of "phenomenology". This field of architectural discourse is explored most notably by the theorist Christian Norberg-Schulz in his book, Genius Loci: Towards a Phenomenology of Architecture (1979). The term usually refers to a location's distinctive atmosphere, or a "spirit of place".

or the environmental characteristics of the site (Achenza and Giovagnorio, 2014). An ecological transformation of building production is possible and is the key concept of a culturally sustainable innovative process, for a Km 0 architecture which takes advantages from the synergistic relationship between land management, economy and design. By respecting soil attitude and climate, natural building materials (like wood, bamboo, hemp, or cotton) can be directly grown, meanwhile others like earth, clay or stones can be used almost without manufacturing. This will increase the occupation on rural areas, will develop know-how and will contribute to employment in a new production chain, which includes farming (local typical products), as well as give thrive to tourism and new business. Many examples are now being developed with this philosophy and are getting even more successful than urban interventions: starting by the need to escape from the pollution of the cities, someone decides to go back to fatherland, restorate old farmstead, preserving a traditional look with an interior modern comfort, able to invite visitors to enjoy the rural landscape features and local products.

Conclusions

When a community implements its settlements, it generates changes of social and economic impacts on the ecosystem conditions. Local communities can reduce their vulnerability in the face of natural hazards and improve their resilience through locally managed and small-scale mitigation activities. However, vulnerabilities can also be reduced through education, raising awareness, and fostering the conscious capacity for building and planning. On the long run, these non-structural methods are often as important as structural mitigation, in a sustainable way of living.

Nature management, agro-clusters, rural services and the role of design as a tool for local resilience, are all fundamental principles to achieve the sustainability. Sustainable architecture must consequently take into account all these aspects of architecture, its surroundings, and human needs, as well as the relationships that exist between them (Memba Ikuga and Murray, 2012). Thanks to an architecture that uses only local resources (internalization or insourcing), both in terms of raw material and of human resources, it is possible to identify the most effective systemic methods to involve the community and workers, holders of the local traditional culture, already engaged in the territory. By promoting a synergistic development between communities, businesses and land usage, through integration of legislative decrees and regulations, it is possible to facilitate a sustainable development process and moreover to generate employment.

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Fig / Rural landscape from the Apolonia archeological site
source / Vezir Muharremaj

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Tourism for Landscape - the new Seman National Natural Reserve / Tourism and protected areas as possible combination for territorial development, protection and valorisation

keywords / sustainable tourism, ecotourism, protected areas, landscape, adriatic-ionian region

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Abstract

Tourism plays a fundamental role in our society, economically, socially and environmentally. But how to relate tourism and heritage, for building a solid and productive relationship between this two elements? This paper explores the concept of sustainable tourism in order to apply it in the Albanian context, and tries to create a strong connection between the protected area system - for both natural and cultural heritage - and tourism - conceived as economic and social resource. The main objective is to show that the development of tourism in protected areas, not always causes destruction and exploitation, but that it can also start the development of strategic processes in specific territories. In its final part, this paper aims to define possible guidelines for the development of Seman region, based on tourism and its protected area. The methodology used, is the comparison of different experiences in the Adriatic-Ionian region, in order to find common features and analyze the management strategies and the adopted solutions. The Seman case is completely different from those, in terms of natural heritage, but the idea is to re-use the touristic approach in terms of management and structures on a territory, where tourism has never been introduced before. Focusing on the importance of international and national policies about protected areas, the paper ends with a paradox proposal for the valorization of Seman river basin through the creation of the Seman National Natural Reserve.

Introduction / Tourism vs Landscape

The "tourism" concept changes according to social and economical global transformations. And so does its approach to the territories, landscapes and cultures. It was during and after the World Wars that tourism became a strong impact activity, as the workers obtained paid vacations and public transportation improved, leading to a better performance in terms of substantially. People started to move more frequently and easily, due to the creation of railways networks, highways and airports. After the two wars, western European countries lived a phase of great touristic development, as natural territories became the main target of private investors[1], who were in search of perfect places for relaxing.

So it was by this time when tourism started to be one of the main actors in the transformation of territories. But introducing tourism in a territory rich of natural heritage is a risky process, which needs to be controlled and well planned. Tourism may be either a threat or a tool in improving global sustainability (Buckley, 2003). So how can tourism be a resource for territorial development? Which is the right touristic model to protect the natural and cultural heritage?

From sustainable tourism to ecotourism

The word "sustainable" has been part of our vocabulary and our daily issues for too long already. If in many other fields it may have been a mere pretext to legitimize more or less morally correct initiatives, in the tourism industry it remains a real challenge (Vallarola, 2013). Sustainability

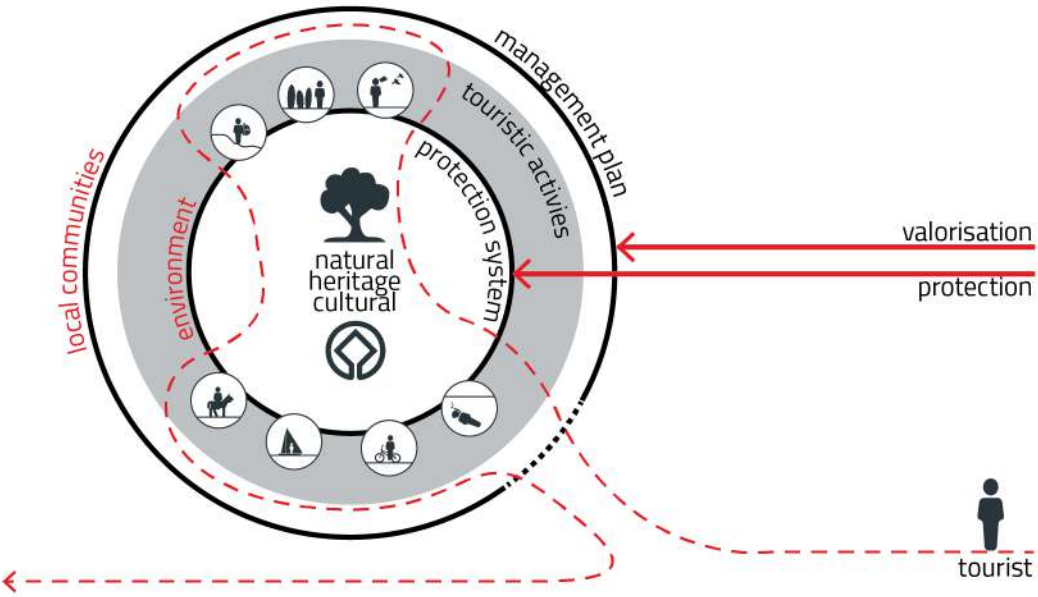

Fig 1 / Ecotourism activities beneficiaries and territorial development actions
source / drawing by the author

is a wide concept and it is often used without fullawareness. But what happens when it is associated to tourism?

The adjective sustainable officially[2] appears associated to tourism in 1995 during the World Conference of Sustainable Tourism held in Lanzarote, Canaries Islands. The "Lanzarote Charter" states that touristic development should be based on sustainable criteria, from an ecological perception, economic development and ethical respect. It also has to consider its effects on natural and cultural heritage, respecting the weak balance of touristic destinations.
The most important element is that by this time tourism was recognized, for the first time, as a powerful instrument of development[3] (UNEP, 1995) to be included in the sustainable development strategies. But when referring to protected areas and natural heritage, the tourism introduction process is still a fragile theme. For this reason in 2000, the Institute for Policy Studies stressed out in the Mohonk Agreement[4] the necessity of identify an "ecologic" branch of sustainable tourism: the ecotourism. According to the conference participants ecotourism is sustainable tourism with a natural area focus, which benefits the environment and communities visited, and fosters environmental and cultural understanding, appreciation, and awareness (IPS, 2000).

The official recognition happened in Quebec Ecotourism Declaration[5], on the framework of the UN International Year of Ecotourism 2002 organized by the United Nations Environment Programme (UNEP) and the World Tourism Organization (WTO). In this occasion, ecotourism has been defined as "sustainable tourism in natural areas that creates benefits for both the environment and the communities visited, and also promotes culture, knowledge and respect for environmental and cultural aspect" (UNEP, 2002). But ecotourism is an ambiguous concept. Hintze (2008) affirms that "ecotourism is nothing more than a kind of environmental show business". So

1 / Italy, France and Spain lived the "colonialist" phase of tourism. Proper cities raised for touristic purpose, such as Port Grimaud and the mission Racine in France, Benidorm and Binibeca in Spain, Costa Smeralda in Italy.
2 / In the Lanzarote Charter, the first official definition of "sustainable tourism" is provided, but it is far away from saying that it is the first time this issue appears. An example is the World Summit on Sustainable Development held in Rio de Janeiro in 1992 where the fundamental principles and the program of action for achieving sustainable development have been provided.
3 / Tourism development shall be based on criteria of sustainability, which means that it must be ecologically bearable in the long term, as well as economically viable, and ethically and socially equitable for local communities. Sustainable development is a guided process which envisages global management of resources so as to ensure their viability, thus enabling our natural and cultural capital, including protected areas, to be preserved. As a powerful instrument of development, tourism can and should participate actively in the sustainable development strategy. A requirement of sound management of tourism is that the sustainability of the resources on which it depends must be guaranteed. (Article 1, Lanzarote Chart 1995).
4 / The Mohonk Agreements is mainly a guideline for sustainable and ecotourism certification programs worldwide and it has been written in 2000 during a conference organized by the Institute of Policy Studies, based in Washington D.C.
5 / The introductory paragraph of the declaration specifies that "The Québec Summit represented the culmination of 18 preparatory meetings held in 2001 and 2002, involving over 3,000 representatives from national and local governments including the tourism, environment and other administrations, private ecotourism businesses and their trade associations, non-governmental organizations, academic institutions and consultants, intergovernmental organizations, and indigenous and local communities".

Fig2 / map of the study cases
source / drawing by the author

how do we avoid this risk?

The development of an ecotourism program aims to create benefits both for the environment and local communities[6] through two simple actions: protection and valorization. So the two main beneficiaries are environment and local communities, while tourism and tourists represent the economic resources for development processes.
The protection action has the natural and cultural heritage as direct beneficiaries and consists of all the interventions aiming to preserve it and monitor its transformations, reducing to minimum the human pressure. Protection is not considerably a profitable economic activity, since it has a cost and it does not provide a direct profit. Tourism and tourists are indirect beneficiaries.
The valorization process is the proper economic activity and aims to enhance the territorial features through tourism. Direct beneficiaries are tourists – that experience the natural heritage and the touristic services – and local communities – that are responsible for providing and managing touristic services. The natural and cultural heritage benefits in terms of investments, since parts of the funds gained in the touristic activities are re-invested for protecting the natural heritage.

The two actions need to be well balanced, in order to avoid negative impact on the environmental quality. This balance can be reached, if priority is given to protection processes, which at the end have an indirect influence on the valorization actions. To develop a correct ecotourism program in a specific territory, there are four main elements to consider: heritage and its protection system and touristic offer in terms of structures and activities.

Adriatic experiences / tourism in the protected areas of the Adriatic-Ionian region

The following paragraphs analyze three natural parks in the Adriatic-Ionian region, focusing first on the attractiveness of the areas, then on the level of protection according to the international and national laws, and on the touristic structures and activities. This comparison aims to show different possible touristic approaches to the natural and cultural heritage in order to develop a proposal for the Seman region in Albania, based on reinterpretation of common features. For this reason, all the chosen cases present an important anthropic presence, such as the Albanian case.

Adriatic experience #1 / the Sečovlje Salina Nature Park in Slovenia

Heritage / The Sečovlje salt-pans are fascinating wetlands[7] of international importance. The combination of an amazing natural heritage - halophyte meadows, reeds, halophyte islets in the basins, overgrown and bare levees and mudflats - and human presence - over 100 abandoned saltpan houses - creates a unique landscape.
Protection category / According to the Slovenian law, the park belongs to the category of landscape park, which is an

Fig3 / Se ovlje Salina Nature Park
source / Tourist board Portorož, 2013

area with intrinsic natural value where the influence of people in shaping, maintaining and caring the environment is evident[8]. The Slovenian Landscape Parks belong to the IUCN category V, the most flexible one. In the objectives of this category there is the creation of opportunities for enjoyment, well-being and socio-economic activity through recreation and tourism (Stolton, 2013).

Touristic structures / visiting centers and info points.

Touristic activities / guided tours, creative workshops, various educational programmes and sportive activities (biking, walking, jogging, rowing, parachuting, surfing, sailing). According to the Management Plan, it is allowed to individuals or small groups, normally up to 15 people, to carry out physical recreation activities, such us biking, walking, jogging and similar activities. Although their purpose is recreation and not visiting the protected area, they are considered paying customers. [...] The park also allows the Rowing Club Piran to do training session in the channel Drnica[9].

The Sečovlje Salina Nature Park is a good example in terms of the management process. Belonging to a protection category, which allows the organization of activities and events, is the starting point for any touristic development process, supported by a Management Plan, which clarifies duties, responsibilities and limitations. In this specific case, touristic activities are related to sport and environment. It is noteworthy to refer to the necessity for considering as "paying costumers" all people that decide to take part in sportive or educational activities, even if they don't enjoy all the touristic activities that the park offers[10]. The tourism introduction, even if limited and controlled, starts processes, such as the creation of touristic services and their maintenance, which have a major economic impact.

Adriatic experience #2 / MPA and SNR Torre Guaceto in Italy

Heritage/ Torre Guaceto is both a Marine Protected Area and a State Natural Reserve, due to its huge natural heritage. The terrestrial part of the reserve hosts the Mediterranean scrubs and a wetland area[11]. Two characteristic habitats[12] have been identified: the vegetated sea cliffs of the Mediterranean coasts with endemic

6 / See above the ecotourism definition.
7 / In 1993, the Sečovlje salt-pans were inscribed on the list of wetlands of international concern under the auspices of the Ramsar Convention, which binds the countries that have signed it - including Slovenia - to protect and conserve the wetlands and strive for their sustainable use.
8 / Art. 71 of the Nature Conservation Act, published on the Official Gazette RS, No. 96/04, 1999 / Zakon o ohranjanjunarave, No. 96/04, 1999.
9 / Art. 9.2 titled "Tourism and Recreation" of the park Management Plan.
10 / The idea of a park tax is not far away from the city tax. City tax or tourist tax is a tax that certain municipalities or regions require hosts to collect from tourists who stay in tourist accommodation such as hotels, B&Bs or vacation rentals as a contribution to the maintenance of local facilities. When applicable, it is the host's responsibility to collect the tax from tourist and pass it on to the municipalities/regions.
11 / Registered as Ramsar Site, wetland of international importance since 1981.

fig4 / Cycling tour in Torre Guaceto
source / intothebike

Limonium[13] and the coastal dunes with Juniperus[14]. The marine area is important for its biodiversity, both for its fauna and flora species. The Reserve also includes archaeologic sites as the Torre Aragonese, built in 1440.

Protection category / The State Natural Reserve belongs to the IUCN category IV, whose main objective is to maintain, conserve and restore species and habitats (Stolton, 2013). This category aims to protect particular species and habitats (see above) that need regular and active interventions.

Many protected areas of the IV-th category exist in crowded landscapes and seascapes, where human pressure is comparatively greater, both in terms of potential illegal use and visitor pressure (Stolton, 2013). For this reason touristic activities need to be constantly monitored and planned. Due to its heritage, the Reserve is also a Special Protection Area (Birds directive) and a Specially Protected Area of Mediterranean Importance (SPAMI).

Touristic structures / visitor center "Al Gawsit", Punta Penna and Apani services areas, ecologic stations and recovering centre for marine turtle "Luigi Cantoro".

Touristic activities / sea-watching, bike trekking, trekking, diving sessions, sailing and windsurfing courses, cultural and gastronomic events, summer camps and workshops.

Activities are regulated by the internal Management Plan[15], according to which environmental education and research activities, as well as general access is subject to permission[16]. The management consortium organizes educational days as "La via Traiana" - focused on the archeological heritage – and "Discover the reserve with the fishermen" - a project with Lecce University and Slow Food on environment awareness and sustainable fishing.

The Marine Protected Area and National Natural Reserve of Torre Guaceto is an exemplar reference for touristic activities developed according to natural heritage protection. The partnerships established with universities, local and international institutions and the development of profitable projects, such as the Slow Food project about the recovery of a typical tomato species "Pomodoro fiaschetto", allowed the consortium to economically manage the protection interventions.

Adriatic experience #3 / the Brijuni National Park in Croatia

Heritage/ Brijuni Park has an interesting touristic development[17]. Due to historical events, the park has been widely transformed by human presence. Its flora and fauna are a combination of Mediterranean features, with exotic species imported, which are more then 600, both plants and animals[18]. Roman villas, archeological sites and architectural objects of different ages, the natural science and archaeologic museums represent the wide cultural heritage, which includes underwater patrimony and paleontological findings.

Protection category / The Brijuni park belongs to IUCN category II, whose main

Fig5 / Historical reenactment "Kupelwieser on Brijuni"
source / np-brijuni.hr

objective is to protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, and to promote education and recreation (Stolton, 2013). On the Croatian law, national parks have scientific, cultural, educational and recreational purposes. In the national parks, only activities that do not threaten the authenticity of nature are allowed. [...] Tourism and recreation must be restricted to visits, guided tours and sightseeing, permitted to everyone under the same conditions[19].

Touristic structures / hotels, villas, restaurants, conference rooms, marina, info points, archeological and natural science museums.

Touristic activities / cycling and underwater tours, cultural guided visits, historical reenactment The touristic activities disclose the whole park heritage, from the "Cycling Heaven on the Brijuni" path, to the educational underwater trail in the Verige Bay. Cultural guided tours walk tourists through archeological sites, the exotic garden, the dinosaur trail and the zoo. In addition, the park offers the historical reenactment "Kupelwieser on Brijuni", during which an acting troupe evokes the culture and lifestyle of the 19th and early 20th centuries.

The Brijuni National Park is an interesting case in which the touristic "invasion" caused important changes in the natural environment and strongly influenced the local ecosystem. The transformation of the archipelago in a touristic resort in 1900 shaped its natural landscapes, but after being declared as a protected area, the policies changed. Touristic structures are strictly limited to some areas, the ones built previously, and the remaining areas are under protection and under continue monitoring activities.

The protection "label" cannot change the transformations done in the last century and the consequent environmental damages, but it can stop further human

12 / The Habitats Directive ensures the conservation of a wide range of rare, threatened or endemic animal and plant species. Some 200 rare and characteristic habitat types are also targeted for conservation in their own right.Council Directive 92/43/EEC, 1992.
13 / Habitat code 1240, Mediterranean Terrestrial Region Reference List 2010, Natura 2000.
14 / Habitat code 2250, Mediterranean Terrestrial Region Reference List 2010, Natura 2000.
15 / State Natural Reserve Torre Guaceto Management Plan, registered in the Official Gazette on the 26th September2013 / Regolamento della Riserva natural statale di Torre Guaceto, supplement ordinario n°67/L alla Gazzetta Ufficiale n°226 del 26-09-2013.
16 / Only for area A, B and C - the most interesting in term of heritage.
17 / For its strategic position close to the Istrian Peninsula, the archipelago of fourteen islands - known as Brijuni Islands - changed its landscapes according to human presence. First the Ancient Roman settlements, then Venetians invasion, then Napoleone, the Austrian Empire to end with Paul Kupelwieser – an Austrian businessman – who bought the islands and transformed them in an exclusive beach resort in 1900. The two World War saw the islands passing from Italy to Yugoslavia, when it was used by Tito as his personal summer residence. Only in 1983, after Tito's death, the park became National Park of Yugoslavia.
18 / The park hosted also a zoo with many species imported from all over the world, such as chital deer, fallow deer and Asian elephants. Since the XX century, it hosts a Safari park, touristic attraction for European travellers.
19 / Article 4 of the national law about Nature Protection, published on the Official Gazette 30/94 in 1983 / Zakon o zastitiprirodeNarodnenovine30/94, 1983.

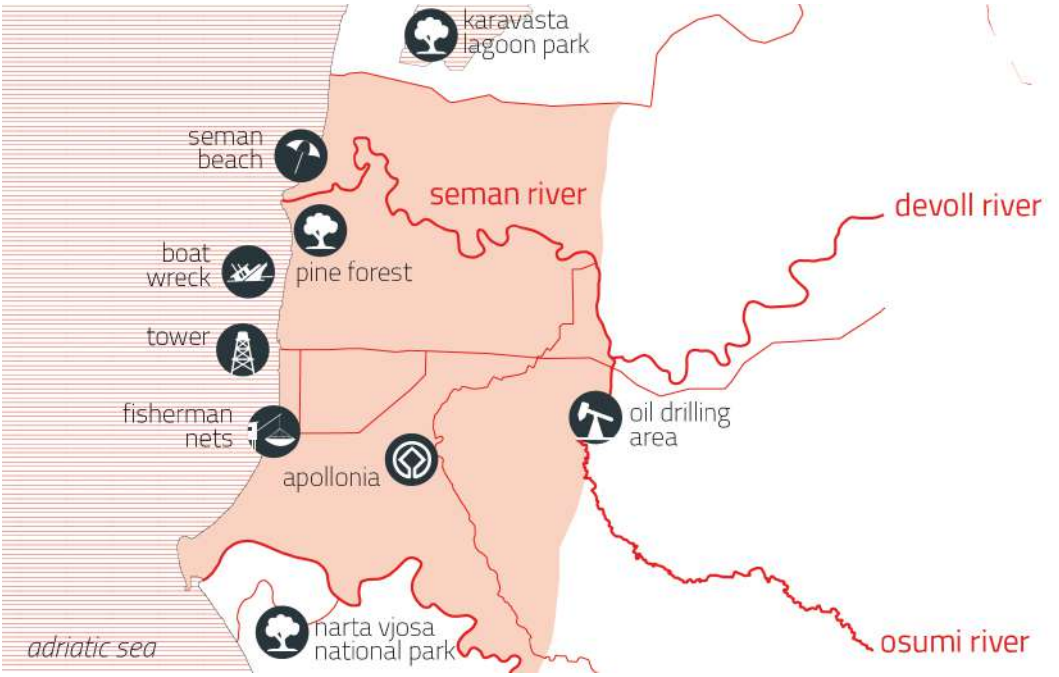

Fig6 / Map proposal for Seman National Natural Reserve
source / drawing by the author

interventions and educate the tourism fluxes to an environmental friendly approach, through specific programs and activities.

The Albanian experience / the new Seman National Natural Reserve

Albania has an extremely interesting touristic potential. This is expressed in terms of natural heritage, as well as historical and cultural. Natural influencing factors are the favorable geographic and geo-touristic position, the variety of natural landscape, an appropriate clime, a rich water assets and rich flora and fauna system. From a historical point of view, the Albanian territory is widely characterized by cultural hotspots (Doka and Humolli, 2015).

Seman river[20] region has a hidden touristic development potential, but it is also rich of environmental problems. The area is strongly polluted, due to the presence of numerous factories and oil extraction sites. The environmental quality represents a territorial emergency. The area strongly needs to be preserved – especially the Seman beach on the Adriatic coast, where the river ends carrying all the pollutant factors. Nevertheless the landscape is beautiful and there are many noteworthy cultural sites spread in the inland, which must be properly valorized. The proposal is to officially recognize the area from the city of Fier to the sea, as protected area and develop programs with touristic purposes, in order to enhance and valorize the region. The following analysis has been developed according to the format used for the study cases, but it still is a proposal.

Heritage / The natural heritage of Seman region is strongly affected by pollution, but it presents many interesting spots, such as the coastal area, where a wide pines forest has been planted during the communist period, and in which the typical Mediterranean flora and fauna are present. From a cultural point of view, the area hosts the archeological site of Apollonia - the ancient Greek city, home of a famous philosophy school – and it is also crossed by the Via Egnatia – the Roman itinerary that connected Rome to Byzantium. In the canals, typical fisherman structures are still operating, despite the low quality of water. In addition there are industrial archeology spots on the coast and in the inland – e.g. the piezometric tower in the sea, the boat wreck on the beach and the machineries for oil drainage.

Proposed protection category / The institution of a State Natural Reserve - IUCN category IV – is suitable for this area where human pressure is comparatively greater, both in terms of potential illegal use and visitor pressure (Stolton, 2013). According to the Albanian law[21], the institution of a Managed Natural Reserve[22] allows interventions to solve environmental problems and the integration of tourism activities. This strategy is even more feasible – from a legal point of view – if thought as an extension of the existing Karavasta Lagoon and Narta Vjosa National Parks. According to the Albania 2030 vision (Aliaj et al, 2015), the Seman basin region is

already planned to be an extension of Karavasta Lagoon which will also include the Apollonia archeological site.
Proposed touristic structures / info points, visiting centre, ecologic stations, industrial archeology museum
The Seman beach will host the visiting centre – the head quarter of the reserve - for both monitoring natural transformation processes and temporary accommodation structure for researchers and tourists. Ecologic stations will be spread in the most polluted spots and they will work as scientific hubs for promoting the Seman water depuration process through the installation of bio-remedation and treatments plants and experimenting different energy resources – such as bio-gas station. The archeological heritage will be connected through thematic itineraries, according to specific features: historical and industrial.
Proposed touristic activities / cycling tours, cultural guided visits, educational programs and summer camps, sailing and windsurfing courses.
Since the area is facing the open sea, sailing and windsurfing are perfect sportive activities to promote. Educational programs in form of workshops and summer camps related with environmental scientific researches can greatly contribute to the territorial development. The cultural guided tours will walk the tourists through the Illyrian archeological heritage and the industrial archaeologic hotspots.

The Seman National Natural Reserve represents an opportunity for both protecting and promoting the territory, increasing and stimulating different kind of economic activities. In this case the institution of a protected area is functional to a protection purpose with large-scale effort and it aims to slowly introduce a touristic model, which attracts interest on the emergency state of the territory.

Tourism for Landscape

"Tourism for landscape" is a strategy for sustainable territorial development. Tourism becomes a tool for activating transformation processes, acting as the main economic resource, from which the territory benefits in terms of natural heritage regeneration and protection. In the specific case of Seman river area, the industrial heritage assumes a fundamental central role, both in positive and negative. The skeleton of old polluting industries are now considered as fascinating hotspots, and if regenerated they can start interesting development processes. But, as already said, this industrial vocation also determined the high pollution level of the area that strongly needs to be reclaimed.

In this sense, the Ruhr region is an exceptional reference. Simultaneously to the industrial blight during the past four decades, the Ruhr area as a whole gained a growing national and international importance as a centre of business services, science and culture. As a result, the building complex of the coal mine "Zollverein" in Essen became enlisted by the UNESCO as a World Heritage Memorial. In 2006 the Ruhr area was finally nominated as European Capital of Culture 2010 (Trettin et al, 2010).

The Ruhr example is different in extension and importance, but it reveals a new resource for tourism: the industrial heritage, the biggest expression of the human impact on a territory. The capitalization of industrial heritage can be seen as the most promising field of developing a very distinctive concept of city tourism for old industrialized urban areas. The focus on industrial heritage tourism opens chances (i) to raise awareness about historical processes and thereby creating some inrush of tourists, (ii) to strengthen the local identity and to create new centers of urban life, (iii) to enhance the regional image to attract new investors and, (iv) to restore and prepare the buildings for new commercial and cultural usage (Soyez, 1986).

Seman region represents one of the most critic area, environmentally speaking, of the whole Albania country. The establishment of protected areas, according to the environment protection system, is one possible answer, which through its regulations and limitations helps to plan a sustainable strategy. In conclusion, if developed according to an environment protection system, tourism is a fundamental tool for territorial valorization and enhancement.

20 / The 85km-river crosses the country from east to west and it is the results of Osumi and Devoll confluence.
21 / The Albanian current protected areas law - no.8906 dated 06.06.2002 and updated in 2008 - listed 54 protected areas divided in six protection categories (Strict Nature Reserve, National Park, Nature Monuments, Managed Natural Reserve, Protected Landscape, Protected Area of Managed Resources) and 25 ecological Emerald Areas.
22 / The Albanian protection category "Managed Natural Reserve" refers to the IUCN IV categories guidelines.

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Fig7 / Pitzometric tower on the Seman beach
source / the author

The restoration of water quality in the Seman basin through sustainable practices

Convert settlements activities waste into energy supply source

keywords / water quality, energy supply, waste, sewage, MSW, biogas

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Abstract

Despite the fact that the Seman region is one of the most fertile areas in Albania, the human actions for the last 20 years has compromised its integrity. Existing settlements with their related activities represent a risk for the whole area, its farming potential and people's health. Preserving the remaining integrity and restoring as much as possible the environment characteristics, has to be a priority for national and regional Governments' strategies as well as for basin's inhabitants.
Restoring the water quality must be the first point to focus on. In fact the water has multiple roles in preserving the quality of life and the quality of soil; consequently of land products. One of the factors, which is the cause for the loss of quality of the Seman water is the waste management generated by household activities. The dump of sewage and of dirty water in Seman's streams, the incorrect waste disposal practices and absence of people awareness on the problem, spread waste down the river banks with water pollution consequences. Waste and sewage are sanitary, social and economic dangers to be afforded promptly with strong policies and new guidelines; were inhabitants could be part of these new sustainable practices. The utilization of the households' waste like resource can be a kilometer 0 element to contribute in the water quality problems solution. Anaerobic Digestion from the waste organic fraction and community sewage digester are a possible direction.
The paper investigates the possibility to introduce small scale systems in the Seman basin settlements, predicting a scenario where people are leading the Seman water quality restoration through tools which could be managed personally and which could increase the awareness about the environmental problem.

Introduction

The Seman basin is a precious natural resource for Albania. With its 286 km, including Osum and Devoll, and a drainage basin area of 5740 km2, the Seman crosses the most fertile area in the country with an enormous potential. Despite this valuable source, the current situation of the basin compromises its use and its development. In the last 20 years the unorganized development of Albania has caused a rapid escalation of human activities, from housing to economical ones, with compromising environmental consequences. In this scenario the Seman river has not been spared and today it is among the most polluted rivers in Albania (INSTAT - Ministry of Environment, 2014). From not well planned oil drilling activities, abandoned industries, not urbanized settlements, to the lack of policies related to waste collection and management, there are many causes that have heavily damaged the Seman water quality.

In the approach to Seman basin environment restoration, the population involvement and awareness can represent a crucial step towards the refurbishment of water quality, focusing the attention

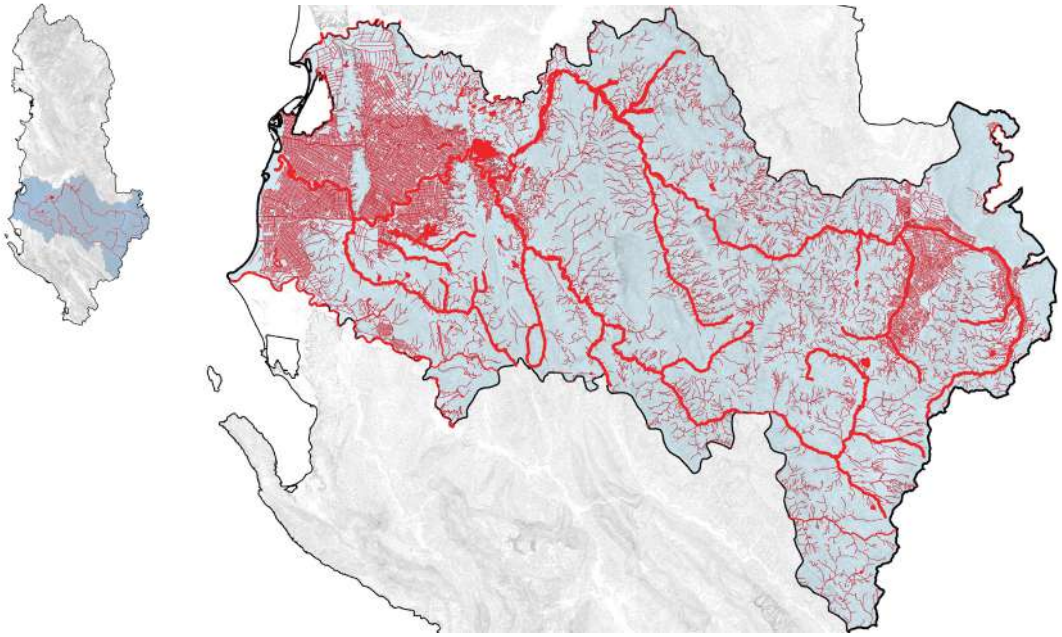

Fig1 / Seman basin placement in Albania
Fig2 / Water extension in Seman basin area. The water, in red, is a constant presence all over the area of the basin. The following figures show the contact among water, dumpsites and cities. source / GIS data from geoportal.agis.gov.al and GIS by POLIS University

on waste problem related to human settlements in the basin. The paper investigates a possible direction which could potentially inform citizens and their role inside the natural area where they live in, through biogas utilization. Indeed, biogas from household biowaste can be an alternative solution to current waste management practices, from one of the causes of Seman pollution generated by human activities (discharge in the river), into a source with multiple merits in line with the EU principles and environmental strategies, social and economic; another step for Albania in regards of the involvement and integration in the European scenario.

The paper is developed in four parts: the first underlines the Seman river/basin problems related to human settlements; the second investigates Albania potential in the utilization of waste with energy aim; the third part is dedicated to the identified Dermenas municipality case study, focusing the attention on biogas potential in small size settlements; the last part hosts conclusion with the expected outputs and the opportunities allowed by these sustainable practices.

The household waste / a cause of Seman river damage

The process in identifying the Seman pollution causes is not simple. In fact, the length of the river, the extension of the entire basin and the diffuse presence of human settlements with the related activities, makes the scattered scenario hard to read. For this cause this work is going to outline the relation between waste sources and the river, focusing the attention on household waste for Municipal Solid Waste and wastewater.
The Seman basin role in Albania is crucial. In fact, if its agricultural potential could be an economic resource for the entire Country, its central position (figure 1) is fundamental for the environment in the entire state. In fact, 4 out of 10 prefectures (Fier, Berat, Elbasan and Korçe), the 40% of the regional authorities in Albania, have to afford Seman policies and management, underlining the national role of the basin for the whole State.

In this scenario a relevant factor of the basin management is the extension of its water. In fact, due to an underground aquifer close to the surface, the area is filled with water from the main stream to the agricultural drains (figure2). Consequently, the water is in contact with all the activities which take place in the area: settlements and dumpsites at first.
The spread of settlements in the Seman area is a first component to take into consideration. As shown in figure 3, there are a few big size cities (Berat, Fier and Korçe), some mediums size urban centers and a diffuse presence of small city and villages. The result is a decentralization of waste production in all the analyzed area. This represents the first problem for the Seman water quality. In fact, the human presence and its daily activities produce tone of waste and sludge which need to be properly treated. Albania disordered construction development since 1992, has consigned today an ensemble

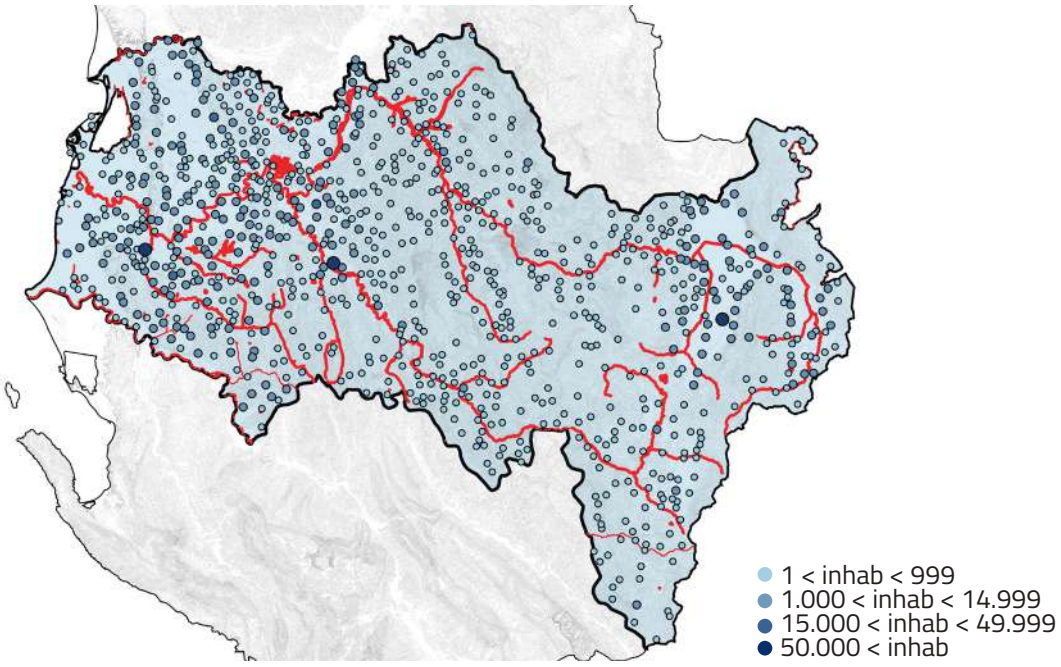

Fig3 / Settlements in the Seman basin area. The settlements are diffused in the area, especially in rural area lacking o infrastructure for wastewater collection
source / GIS data from geoportal.agis.gov.al and GIS by POLIS University

of unorganized settlements poor of infrastructure and proper waste collection systems. The most affected issue stands in the sewerage system. Indeed, only the biggest cities have an adequate wastewater collection infrastructure while all the other settlements spread in the basin area, small and medium size, are poor of these systems. In addition, the total absence of wastewater treatment plant is another problem (INSTAT - Ministry of Transport and Infrastructure, 2014). As a consequence, all the sewage collected or not collected is discharged in the Seman stream and its drains, with an uninterrupted contamination of the water damaging its quality with health hazard for population, its cultivation and livestock.

In addition to sewerage, a different question could relate to household waste. Despite the quite good collection system and coverage (Fier 89%, Berat 53%, Elbasan 45% and Korçe 99%, Kodra and Milios, 2013), its disposal represent a risk for the entire area. In fact, the dumpsites are usually located close to the river (figure 4) and the recurring floods inundate the disposal areas and scatter all the waste in the water. The effects are devastating, with the entire waste collected, organic and not organic, are disseminated along the Seman streams from the dumpsites to the Seman mouth, with environmental, social and landscape consequences.
In front of these problems, biogas offers an opportunity to identify a solution to challenge the few economical and education sources.

Seman basin biowaste as energy opportunity

The waste can be an economic, social and environmental source thanks to its energetic potential which is nowadays not exploited in the proper way in Albania. Indeed, the generation of Municipal Solid Waste (MSW) per inhabitant is significantly increased in Albania in the last years with 335 kg per capita in 2010, 80% more than the 2003 data (Kodra and Milios, 2013). Waste generation represents a real challenge in management practice for Albania and it is important to focus on sustainable practices which can decrease the MSW quantity disposed in dumpsites. In this scenario the utilization of biodegradable part of MSW is a precious opportunity. In fact, the organic fraction in Albania average of MSW is the 47,63% of the waste stream, about 160 kg per capita per year, where the whole biodegradable part is up to 208 kg per capita per year, including wood, paper and cardboard (Kodra and Milios, 2013). Therefore, the 62,3% fraction of MSW is biodegradable and it is considered as a Renewable Energy Source, not used in Albania. In fact, the high percentage of MSW's organic waste is either recycled or composted without any prevention from being disposed in landfills and consequently the natural organic waste biodegradation in methane (CH_4) is emitted in atmosphere from landfill sites increasing GHG emission. The absence of strategies for the utilization of CH_4 in Albania from organic waste is today an economical and energy loss.
Surely its utilization depends on national/local strategies and the related

1. Fier
2. Dermenas
3. Levan
4. Topoje-Seman
5. Roskovec
6. Patos
7. Berat
8. Urë Vajgurore
9. Kuçovë
10. Çorovodë
11. Poliçan
12. Bilisht
13. Mborje
14. Korçe

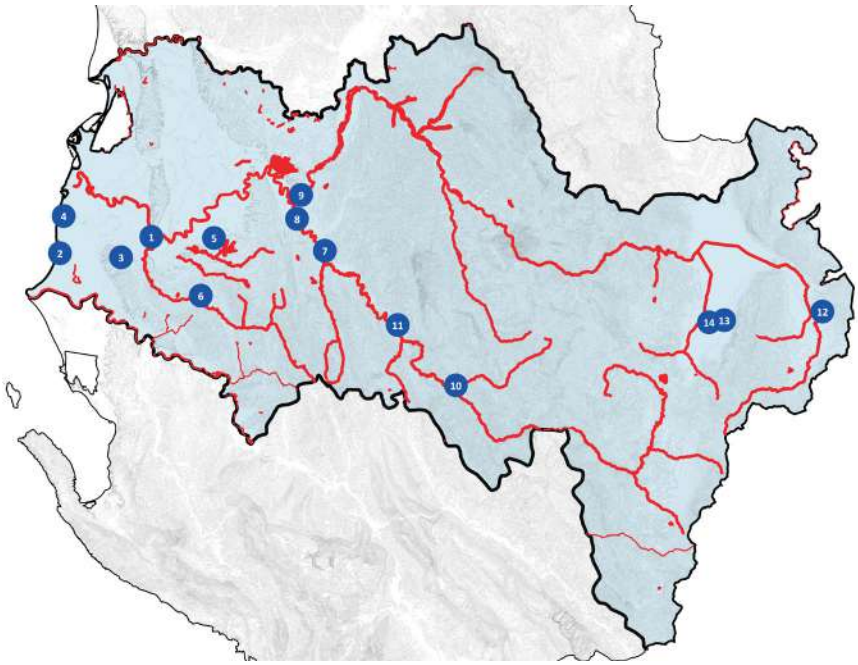

Fig4 / Official dumpsites close to Seman river. The recurring floods inundate the waste disposal sites and cause the waste scattering down the Seman stream
source / GIS data from geoportal.agis.gov.al and GIS by POLIS University

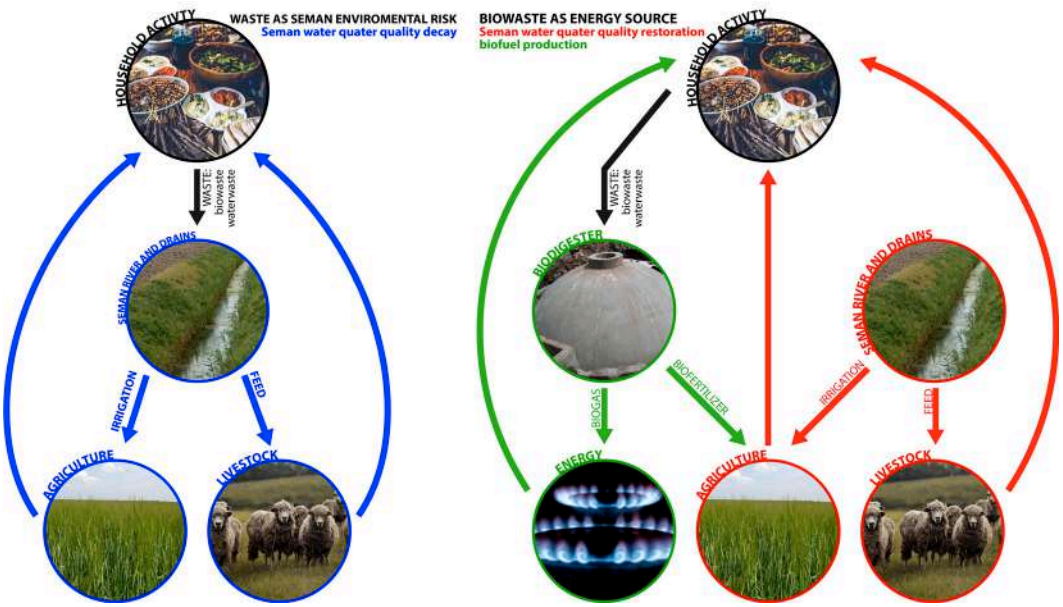

Fig5 / The change of the chain of waste in Seman basin. Waste becomes a new resource for the basin offering a sustainable opportunity to improve agriculture quality, livestock feeding and energy source
source / drawing by the author

policies. The definition of good practices to decrease waste production and collect separately waste components is fundamental for the management actions. The waste governance has to address new sustainable ways in order to achieve waste management targets with advantages for the population, decreasing the costs, and enhance waste companies to use recyclable waste separators at the origin. In this condition, the exploitation of organic fraction through biowaste is a possibility. Instead of keeping on the creation of landfills as predicted by the National Waste Strategy and the National Waste Management Plan 2010-2025, the producers their selves can be responsible of the part regarding management waste being involved as a matrix of the whole waste chain. Improve population's capacity building can allow in improving sustainable and environmental awareness, aiming in recycling/composting 55% of municipal waste by 2020 and reclamation energy from 15% of municipal waste by 2025. The spread of these new practices could enhance a shift from the current absolute reliance on land filling to population involvement in recycling, composting, and achieving energy targets.

In the same way another pollution element in Seman River as wastewater can become a source, answering to the limited sewerage system and the absence of treatment plant in Seman area. While major municipalities should predict for wastewater plants findings the needed funds, for the hundreds of spread villages funds are hard to find. Differently from the urban context, for rural settlement it is possible to propose an alternative solution for waste water. In fact, considering as the major part of Seman basin's population (Berat 54,39%, Elbasan 59,95%, Fier 57,94% and Korçe 59,50% INSTAT, 2016) live in an extended rural area poor of infrastructure whose realization is difficult to imagine for economic issues. Despite national and county authorities have not the adapt resources to realize sewerage systems and wastewater plants, thus it is seen as an important task of thinking about alternative solution to avoid the sludge dispersion in Seman water streams and consequently in the agricultural fields. The creation of displaced wastewater collectors localized close to small village aimed to the production of biogas, can represent an interesting and spreading solution.

In addition to the biogas production as energy source, the digestion of biowaste produces also a biofertilizer which can be a natural substitute to the chemical fertilizer diffused today. Its utilization increases the fertility of the land and it can be directly used by the citizens who will manage the digester, sold in the market, increasing the family available incomes.

The appliance of these directions could allow in transforming two pollution causes from an environmental problem in a sustainable solution (figure 5). In the next paragraph the case study provides an understanding of the potential of this source and consequently how could it contribute in the prevention of water quality.

An estimation of biogas potential / the case study of Dërmenas

The municipality of Dermenas is one of the 17 municipalities of the Fier prefecture. It is located in the most productive area of Seman and it is characterized by a grid of drains which conduct water in the whole area. The population is 11.662 (GIS data) and it host 11 villages with Dërmenas which is the most important one. This municipality has been chosen as a general example of small size village to test biogas digester feasibility.

The table 1 shows the potential of biogas of each village. The choice has been considering not all the potential of biowaste, but only 80kg/year for capita, only 50% of the full potential as previously estimated. The reason of this choice stands in the need to develop a building capacity for citizens, where this threshold can be considered an easy target to be achieved in a short time. The component of methane inside biogas is equivalent to 65%.

Concerning the wastewater, the existing literature, considers 0,5kg/day per capita as a good approximation of sludge, which is 182, 5 kg per year with a percentage of methane around 68% of biogas volume. The result is a total potential biogas production of 154.759, equal of 104.544 Nm3 of CH4, a yearly energy source today dispersed.

Two different solutions have been hypothesized for biogas utilization. Table 2, the solution has been found in a CHP generator operative for 7200h/yr with a heat performance of 47% and an electricity performance of 39%. Excluding the Krygjatë village the one with less population, the villages assure a good result with the opportunity to install cogeneration systems.

The second use proposed is household cooking. The calculation presented in table 3, show how many people can be served, village by village, considering an average household type of 3 people, based on Census 2011. The result is meaningful: almost the 30% of population can be served with the opportunity to eliminate the conventional cooking methods, especially stoves or firewood, strongly air polluted.

Conclusions

The solutions for water quality improvement can be more than one, but a bottom-up approach can lead to a spread success; the results are multiple.

Firstly, there is a medium-long term environment effect which allows an increase of water quality. Indeed, a huge diffusion of village biogas systems can support the Seman decontamination of the water through the exploitation of biowaste inside basin's villages. The positive consequences of this process is the decrease of the waste landfill, with a reduction of the space aimed for disposal, and a diminution of the current health risk represented by dumpsites and their scattering during floods. The effects are an improvement of Seman water quality for its daily activity uses, such as drinking or irrigation, and a reduction of social cost for waste management as a consequence

Village	People (inh)	Type of waste	Inhabitant Matter (kg/inh/yr)	Total Matter (t/a)	Organic fraction (t_{so}/a)	Biogas (Nm^3)	CH_4 (Nm^3)	CH_4 total (Nm^3/village)
Dermenas	1.847	OFMSW	80	148	38	20900	14.212	16.610
		Waste water	182,50	337	17	3689	2.398	
Fushë	860	OFMSW	80	69	18	9900	6.732	7.860
		Waste water	182,50	157	8	1736	1.128	
Sulaj	614	OFMSW	80	49	13	7150	4.862	5.708
		Waste water	182,50	112	6	1302	846	
Hoxharë	668	OFMSW	80	53	14	7700	5.236	6.082
		Waste water	182,50	122	6	1302	846	
Havaleas	540	OFMSW	80	43	11	6050	4.114	4.819
		Waste water	182,50	99	5	1085	705	
Krygjatë	120	OFMSW	80	10	2	1100	748	889
		Waste water	182,50	22	1	217	141	
Pojan	1472	OFMSW	80	118	30	16500	11.220	13.054
		Waste water	182,50	269	13	2821	1.834	
Povelçe	1066	OFMSW	80	85	22	12100	8.228	9.639
		Waste water	182,50	195	10	2170	1.411	
Darzezë	1406	OFMSW	80	112	29	15950	10.846	12.680
		Waste water	182,50	257	13	2821	1.834	
Radostinë	1867	OFMSW	80	149	38	20900	14.212	16.610
		Waste water	182,50	341	17	3689	2.398	
Baltëz	1202	OFMSW	80	96	25	13750	9.350	10.902
		Waste water	182,50	219	11	2387	1.552	
TOTAL	**11662**					**155.219**	**104.852**	

Tab1 / Hypothesis of production of biogas in Dërmenas Municipality. The 11 villages produce different biogas quantity in relation with their population source / table by the author

Village	CH4 total (Nm3/village)	Thermic Energy installed (kWt)	Elettric Energy installed (kWe)
Dermenas	16.558	11	9
Fushë	7.710	5	4
Sulaj	5.504	4	3
Hoxharë	5.988	4	3
Havaleas	4.841	3	3
Krygjatë	1.076	1	1
Pojan	13.196	8	7
Povelçe	9.556	6	5
Darzezë	12.604	8	7
Radostinë	16.737	11	9
Baltëz	10.775	7	6
TOTAL	**104.544**	**67**	**55**

Tab2 / Hypothesis of Biogas utilization through CHP generator source / table by the author

Village	CH4 total (Nm3/village)	cooking gas 3inhs (Nm^3/yr)	people served
Dermenas	16.558	90	552
Fushë	7.710	90	257
Sulaj	5.504	90	183
Hoxharë	5.988	90	200
Havaleas	4.841	90	161
Krygjatë	1.076	90	36
Pojan	13.196	90	440
Povelçe	9.556	90	319
Darzezë	12.604	90	420
Radostinë	16.737	90	558
Baltëz	10.775	90	359
TOTAL	**104.544**		

Tab3 / Hypothesis of Biogas utilization through cooking utilization source / table by the author

of flooding events.
Moreover, there is also an energetic result with the methane produced by biodegradation suitable in supplying settlements' (houses) with biogas usable for cooking as for energy co-generation, not dispersing its energy potential in atmosphere.
Another outcome is the social aspect. The solution proposed can contribute in the creation of a capacity building of the population through the exploitation of their waste as source. The citizen's awareness in biogas zero kilometer energy sources could be also improved by using other settlements' activities as agricultural waste, livestock manure, green waste from natural area along the river bank.
Biogas has today an underestimated potential, but a technology and an environmental impact, related to expected emissions, which is deeply known with remarkable opportunities in rural applications (Wellinger, Murph, Baxter, 2013). The existing know how offers a sustainable instrument which can contribute strongly in the decontamination of Seman water quality, with waste which turns into a source to exploit, obtaining social, economic and environmental positive results.

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Fig / Rural landscape from the Apolonia archeological site
source / Vezir Muharremaj

Layers of archeology / Industrial and historical archeology heritage: possibility of regenerating strategic territorial infrastructure by carefully selecting similar case-history as referable benchmark

keywords / Adriatic corridor, protected areas system, landscape, cultural heritage, Via Ignatia, industrial heritage

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Abstract

The investigation of two different landscapes and two particular potentialities of the innate in the Seman river valley will be the object of study on this article. One of the factors analyzed is the cultural Heritage, a resource that is waiting to be connected to a larger system. The other factor is the industrial legacy, which is waiting to be in some parts stopped and reorganized. Starting from those two apparently different qualities of the valley, the research tries to build a unique system of strategies for landscape regeneration. The strategies refer to two key studies for both potentialities: one study is Carbonia Park, in Sardinia, which is a recent example of conversion and conservation of an ex-productive area in a Mediterranean context, and the other one is the Via Appia close to Rome, and the surrounding area that crosses by.
The peculiarity of the Seman valley, indeed, is the different historical and industrial layer, as a typical potential for some areas of the Mediterranean, where an important and still present, historical basis can be connected to other periods of development. Another interesting redevelopment of large-scale of productive areas is the Emsher Park, in Germany. Emsher Park is a regional park, which claims a territory completely occupied by abandoned industries, where the landscape is almost exclusively represented in historical values by industrial archeology of the last century. Different areas will be examined, because the aim is to suggest strategies to relate to these different solutions in only one region, as the Seman valley is not involved in an already clear system, by pointing out places and qualitative characteristics of the existing area.

Smart Landscapes

Talking about Smart Landscape requires a framework on the strategic willingness of the potential redevelopment of the territory. It is a landscaping derivation of various concepts that have been developed for the contemporary city: the concept of "smart" is extended to the landscape as the city and its surroundings.

Another relevant vision is the one on the territory given by Alberto Magnaghi, written in his most important book "Il progetto locale", where he lays the foundations for a new way of thinking the territory: "essential is the rise of a 'place of consciousness' (for neighborhood, city, valley, bioregion) intended to protect the common assets, culture, urban and rural landscapes, local products and knowledge" (Magnaghi, 2000).

Before introducing the Smart Landscape, it's important to explain the definition of "Cultural Landscape", which is a kind of landscape independent from existing administrative conditions. The elements that represent the boundary conditions from which different territories can be identified are the historical and geographical factors. So the historical-geographical identity, or cultural and

Fig1 / Map of the Territory Crossed by Via Egnatia
source / viaggioadriatico.it

environmental patrimony, is a reference to a real system of values, which identifies a micro culture on a local level, as the Cultural Landscape is. Based on those values it is evident that in the Seman valley it's possible to find both historical and geographical, as well as morphological and anthropological notable aspects.

On the other side, the concept of Smart Landscapes is particularly interested in the rural area, although nowadays it's focusing more to local economies and markets, towards new "smart" management models. These systems will be able to combine new technologies , with the needs to develop multifunctional agricultural activities (environmental services, ecological, social and cultural services) exerted by farms in a traditional rural area and in new contexts, as indefinite areas on the periurban and urban fringe, however, still preserving the rural resources (landscape, biodiversity, food quality and safety).
Heritage and cultural identity should become catalysts for creativity and innovation, recalling that the intentions of the results will have an interest in sharing preconditions, results and indicators with specific measurable and attainable data.

Smart Archeology / Industrial archeology

At the same time, industrial heritage and Roman consular roads are fractures and continuity of landscape in a very long term. A type of comparison was developed by a series of UNISCAPE's[1] workshops, which take Via Flaminia and the industrial archaeological items that are in its path, as a case study. The topics proposed by the conferences are interesting for the Seman valley, because they unify two types of landscapes, not commonly associated: the productive landscape along ancient corridors, the traditional communication routes, or the industrial archeology of transport, and road infrastructure and the contribution to the enhancement of the industrial heritage and the one of the historical paths.

In fact, this vast complex of proto and early industrial sites, infrastructure, manufacturing, old plant is particularly dense along the traditional routes of communication. By these characteristics, it is possible to fully exploit the territory, without demonizing some more recent places, still in a process of economic and functional modification, to the detriment of a more accepted archeology of the ancient, normally conceived as historical heritage. The proximity of ancient remains close to industrial plants, sometimes in disuse, presented together with the territorial infrastructure within the passage of centuries, enables the continuation of its axis according to the daily usable communication flows.

Via Ignatia corridor, Albania / Via Appia, Italy

Via Ignatia corridor, Albania _ The Seman region was part of the Illyrian territories, where the first kilometers of the "via Ignatia"started. This is an ancient road built in 146 a.c. by Gaio Ignatio, proconsul of Macedonia. Is it possible to find its presence in Peutinger maps, where it's

Fig2 / Ruins of ancient Apollonia, Albania
source / wikipedia.org

easy to reconnect the via Appia which arrives in Brindisi from the Byzantine Empire. Today it is known as corridor n°8, in the European frame of roman axes, but the road represented a vital gateway from the West to the East, linking a chain of Roman colonies, stretching from the Adriatic Sea to the Bosporus gulf.

This passage has lost its visibility in the passing years, but many archeological sites and cities of ancient foundation are placed on its way. A relevant archeological site close to the city of Fier is Apollonia, founded in 588 BC from Greek colonists from Corfu and Corinth, located close to the Vjose River, in a site initially occupied by the Illyrian tribes.

It began as a harbor city, but came to be known as a cultural pole during the Roman Age because it hosted a renowned school of philosophy. At that time the Odeon, the library, the triumphal arch and the temple of Artemis were built, and nowadays they still are in a very good condition, thanks to the isolation which kept them safe. The site underlined its expansion in the Byzantine period, when a church was built, and that confirms the use in those years of the old via Ignatia, and the confluence and conjunction of the two empires. Yet, although close to the Divjak-Karavasta national park (see "Albania 2030 Manifesto, A National Spatial Development Plan" proposed by Aliaj et al), and the old axis marked by Ignazia road, this is brought into the system with the surrounding territory, indeed, rejoicing in its isolation.

A first strategy would be to recognize the route of the Via Ignatia, for its touristic and cultural potentials, same as in the Roman Empire, or the Appian Way. The Appian Way passes through urban centers, by now well established, with a strong relation with the touristic influence from the city of Rome. On the other hand the site of Apollonia, is more dislocated to attract cultural tourism by itself. The largest set that contains a system of cultural tourism should be therefore the Egnatia road, as, in a different scale, Roma for via Appia. On these terms the first step is to be able to support a wider cultural itinerary.

Via Appia _ Is a Roman consular road, the biggest during the Roman Empire, which connected Rome with the most important Italian port for Greece and the Orient of the empire, Brindisi, to the Adriatic sea, and actually the old continuation of Ignatia road[2]. The way was paved with large boards, or "slabs" of polygonal basalt stone. The track had a standard width of 14 Roman feet (about 4.15 meters) sufficient to allow the simultaneous passage of two wagons in the two-way traffic. For most of the stretch of road, especially near populated centers, the road was lined with large villas, from an infinite number of monuments of all sizes, arranged in several rows and especially sepulchral plants of various kinds.

To maintain the interest and the appearance of Via Appia alive, over the centuries it has continued to have a central role for trading in the south-east Italy. In the eighteenth century Pope Pius

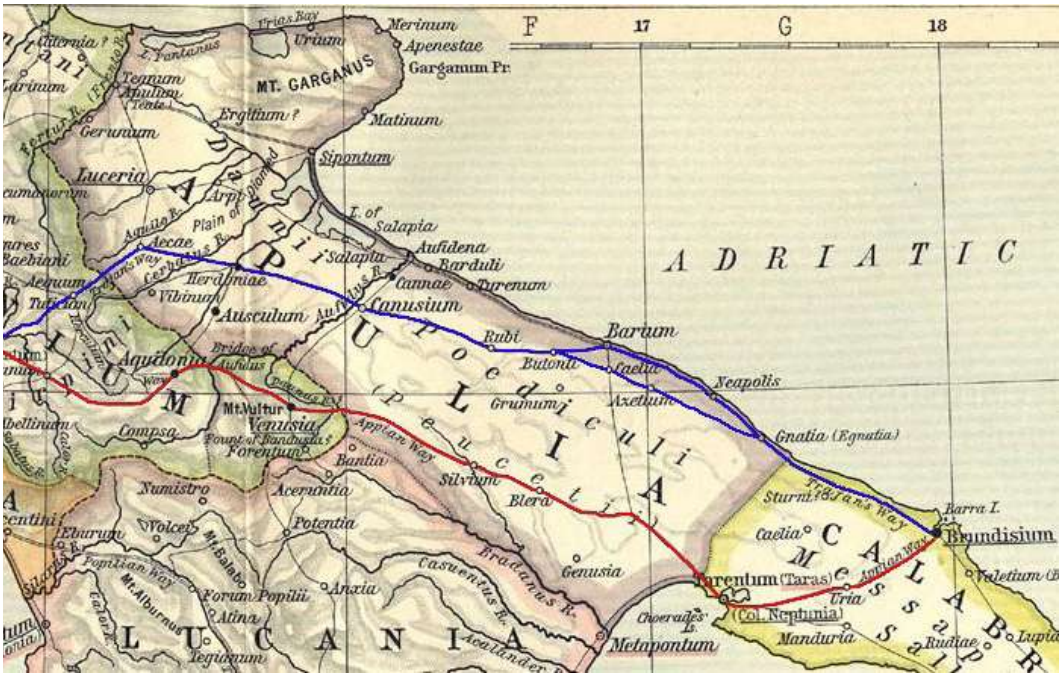

Fig3 / Paths of the Via Appia. Appia Antica in red, Appia Traiana in blue source / wikipedia.org

VII and Pius IX decided to restore dignity to the road by removing rubble and bringing large parts of the original paving to light.

Yet, the current romantic aspect of the Via Appia Antica is made by the interventions first of Antonio Canova and then, in a more systematic way by Luigi Canina. The interventions were characterized by the inclusion of the ruins in a landscape setting, through an ex-novo construction of the monument remains, by which he has created an archaeological suggestive landscape. As suggested by Piranesi through his engravings, there where the ruins are reconstructed, a landscape which refers to the patterns of the past is invented. Unfortunately, in more recent times the territories around this path have seen a great neglect of the landscape given by unauthorized development of buildings and mismanagement. Only now "La Soprintendenza Speciale per il Colosseo, il Museo Nazionale Romani e l'Area Archeologica di Roma" is carrying out numerous projects to enhance and constantly assure conservation work aimed at the use by all citizens, of this immense public good.

Fier, oil drain / Carbonia Park, Carbonia, Sardegna

Fier. Oil Drain _ The establishment of Patos-Marinza is situated on the Seman River region, in the Municipality of Fler, and its discovery dates back to 1928. It's currently the largest on-shore plant in Europe and consequently also in Albania. The construction of wells and the extraction of oil dates back to 1930. 2,000 oil wells were in action in the late 1970s near this southeastern town, but today only 700 wells remain in working conditions, most of which have been abandoned during the communist dictatorship years.
The Patos-Marinza field, is in possession of the Banker's petroleum, a Canadian company, which restored some parts, providing them with a more modern production process. Unfortunately the territory, due to its exploitation over the years, is extremely polluted, so the brunt goes to the population living in those areas.
Many of the old wells are in non-controlled areas. The structures date back to the 30', with a relatively limited productivity, the drills are sometimes in the gardens and in the fields of the inhabitants, making the area object of a big and deteriorating pollution. What is important to mention, is that in the past in contrast to some places of extraction and oil mining production in Europe, during the period of dictatorship in which the state had a strong territorial control, an integral vision for the plant wasn't expected and a strategy for housing the workers away from the extraction wells, wasn't proposed either.

That happened for only a part of the plant, now partly in disuse, and located in

1 / UNISCAPE European network of universities for the implementation of the european landscape convention.
2 / Works of via Appia construction began in 312 BC, at the behest of the Appio Claudio Cieco console (Appius Claudius Caecus) who made renovate and expand an existing road that connected Rome to the hills of Albano.

Fig4 / Via Appia within the ancient Minturno
source / wikipedia.org

close contact between the inhabitants of the place, in the Patos-Marinza site. No division between the areas of extractions, transportation and daily life. The close fields for subsistence agriculture are located in the same places of the drills, with polluted soil and contaminated aquifers. In 2004 for managerial purposes the plants were transferred to the Banker's Petroleum, who has been entrusted by the European Investment Bank and the World Bank two hundred millions of EUR, for the rebuilding of the plants and cleaning of the territory.

A possible solution would be to create a sort of "open air museum", an area in great balance between the production and the housing abandonment, which would be done by permanently freezing the process of extracting wells too close to the housing area and, by reclaiming the territory, making parts of it accessible to visitors, strengthening an economy based on agriculture, tourism, and work sites displaced from the plants.A relevant thing about the situation of this territory, the typical case and the result of a series of events happening in Albania after the dictatorship, is the fact that being at different levels of organizational capacities, still has to be resolved. On one hand the local government should develop a residential plan, away from the exploitation area, but still related to it, since it is a working site for the residents. On the other hand many of the plants between the houses are abandoned, forming a landscape of industrial archeology characteristics. Another option would be to develop a social housing plan for those who live in the houses damaged by drilling, but this would imply a total abandonment of the territory and dislocation of the inhabitants from their lands.
As a conclusion, it is interesting to underline how some processes that occur on the absence of a preliminary plan, affect a series of consequences, just like the case of Carbonia in Sardinia, or even in the area of Patos-Marinza.
Carbonia Park _ The example of Carbonia[3] and its region Sulcis Iglesiente, is not taken randomly. The interesting part is not only about the recent redevelopment of the complex and its strategies implemented to create an open air museum connected into the region, but also due it its design, conceiving it as a place of production and living. In a pre-war context, the promotion of national mineral resources becomes a top priority, so one of the first measures introduced by the regime was to build new infrastructure and to settle a new satellite-city: Carbonia, which was a foundation city, conceived as an industrial, residential and administrative center next to the mine of Serbariu, the largest italian coal basin.

Planned and built by the Fascist regime and the Azienda Carboni Italiani (A.Ca.I.), the new city was designed by the engineer Cesare Fuzzi and the architect Ignazio Guidi. The complex was built in less than a year and it was inaugurated in 1938, although the construction continued without interruption until 1942. Carbonia is a real example of a company-town, where natural resources have forced the settlement of a dormitory city nearby them, keeping the coal on the underground, and

Fig5 / Patos-Marinez OilField (2011)
source / wikimapia.org

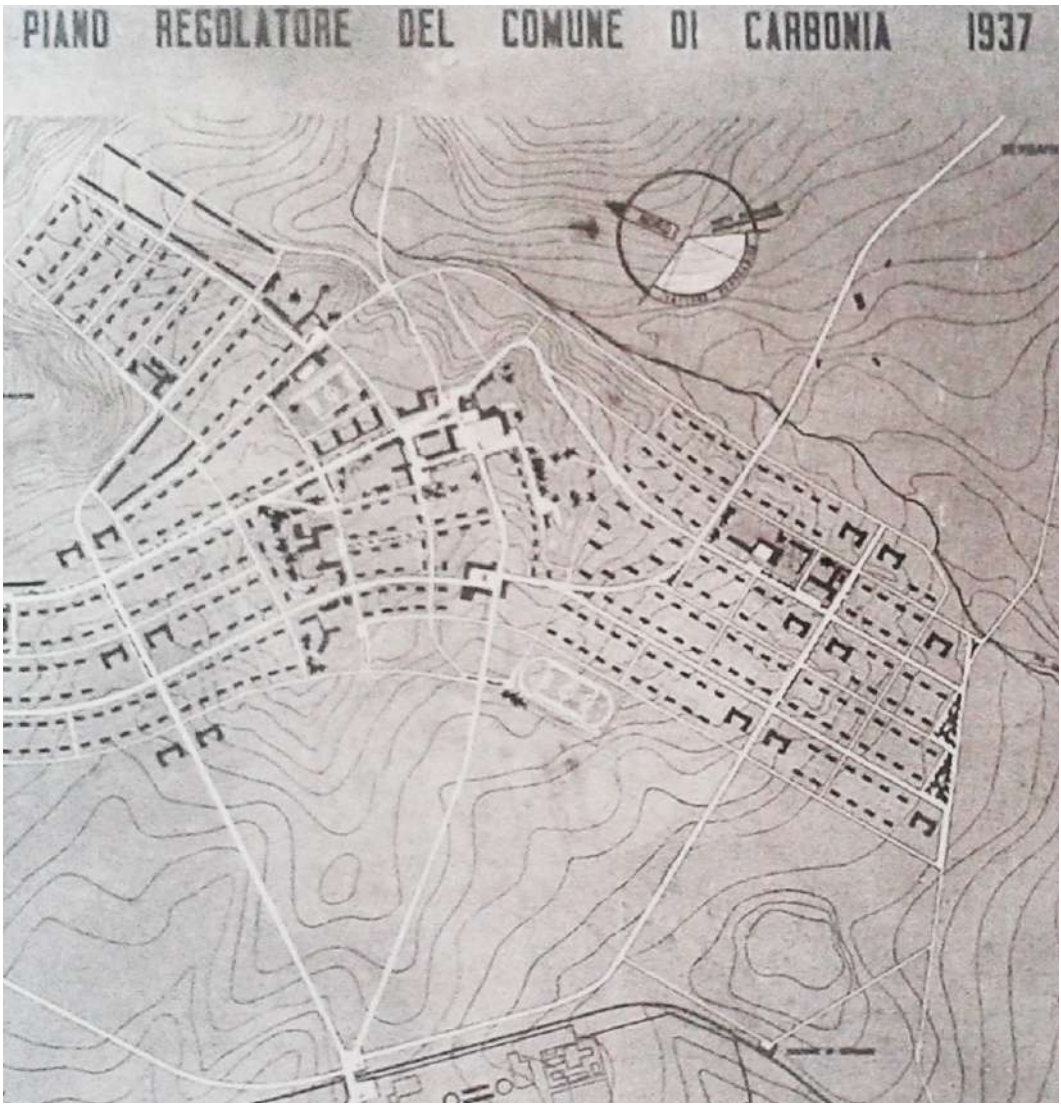

Fig6 / Master Plan Project of Carbonia by Ing. Cesare Valle, Arch. Ignazio Guidi, Arch. Gustavo Pulitzer Finali (1937) / source Peghin G. and Sanna A. (2009) Carbonia-Città del Novecento, Skira

3 The late nineteenth century began the exploitation of the "Sulcis coal" by the "Anonymous Society owns the Baku Abis mine", but is on the 30s of the twentieth century that the mine received a national wide attention due the autarchic approach of the fascist regime coming to the power.

the meantime hosting miners to work. The proximity and interdependence between the place of production and the residential area, was the key to the entire success of the project.
The crisis, which affected the mine production in the 70's was very crucial. It was caused by the energy revolution that led to the closure of mines in the Sulcis territory and the reduction of the population of the city of Carbonia by 30 million inhabitants, the total population present today. This desertification of the valley determined an urgent need for rethinking local capabilities and designing a series of solutions for the area.
Anyway the legacy of the Sulcis Iglesiente mines is made by an area, where it's possible to find different types of specific parks: from those of architectural character, with a path to the city and to the ancient wells, to the geological park and the establishment of a European mining museum. The mining area is therefore characterized by different features, such as those that relate to the preservation of the territory, those that promote touristic development based on natural potentials, and those that emphasize the historical and cultural values.

In fact, the geo-mining Park, established in 2001, is part of the worldwide network of Geosites / Geoparks established by the UNESCO General Conference (Paris, 1997) and aims to safeguard and enhance the geo-minerals values, historical and environmental, and promote sustainable economic and social development of the affected areas. The Geo-mining Park consists of 8 regional areas, the largest of which is precisely the area of Sulcis-Iglesiente-Guspinese with 2,455 square kilometers of surface area affected.
Regarding the mine museum, some buildings on the vicinity of the area have been dedicated and transformed to host the Coal Museum, run by the Italian Center of Culture of Coal.It's important to emphasize that with the appropriate authorities and enforcement strategies, a specific territory may be used in different fields and with different solutions, creating and upgrading different agencies and touristic offers. On these conditions, from a specific territory with a particular identity, it was possible to define a geological park, a mining archeology museum and a site dedicated to the rationalist architecture of the early 900's. The different scales of intervention demonstrate and preserve the work of man, and attract a broader spectrum of visitors, ensuring the preservation of the territory as a whole.

Linked system: regeneration actions of Italian archeology and valuation on Seman river's heritage

In both cases the comparisons are concerned with highlighting different sides from each of the interventions. The Italian cases studies have been chosen as best practices and both have strong historical and cultural values, which are very similar to the topics and landscapes that are found on the Seman river. New forms of understanding the territory have led us to know that, the bigger the integration between different elements of different natures, the more they will be included in a new unified landscape, creating an interesting and functional system usable by people.
These types of landscape can be defined as "smart", as they seek to optimize the opportunities for local technologies to be implemented and operate. Therefore, the main task of the research is to highlight possible examples and processes that developed them. Obviously the comparison between Via Ignatia and Via Appia is not directly related. Indeed it is not intended as a comparison, but instead as a form of understanding how an area could be developed by taking in consideration an old axis that passes through it, not only for touristic purposes, but as maintenance and cultural advancement incentives too.
Regarding the example of the mines of Sulcis Iglesiente Carbonia, for the case of Pathos Marinza, it can only emphasize the deficiencies or the basic needs for intervention in the area of Patos Marinca. In Carbonia, there was expected a plan, which matched with what nature provided along, so in the case of Patos Marinza, even though it was built in the dictatorship period, it was a well planned settlement close to the working site. It still takes a long time before the Fier oil complex renews its disused parts and completely renovates, and make a safe environment for its working and living inhabitants. The vision of bringing together the two parks of archaeological themes, of very different functions and ages, suggests to look at a transversal manner territory, thus creating a dichotomy for a unique achievement and complementary, but essential to one another as well.

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Fig7 / Carbonia panoramic view (1940)
source / PEGHIN G. and SANNA A. (2009) Carbonia-Città del Novecento, Skira

Fig8 / Apollonia archeological site
source / PhD workshop students

The Seman basin and the pollution: biological solutions / Utilization of phytodepuration, hydrodepuration and biological depuration as systems for allowing Seman basin to refurbish its natural resources

keywords / pollution, biodiversity, biology, water

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Abstract

This study defines the environmental problems concerning the Seman basin. The present situation in the Seman basin is characterized by an evident biological and chemical pollution resulting both from human settlements and productive activity (chemical industry, oil extraction and agriculture). The environmental problem is mainly the consequence of oil-extracting activities. This study aims to evaluate the effect of new biological solutions, new system-restoring procedures based on bio-remediation using specific and appropriate plants and biodegrading bacteria. This study includes an in-situ investigation of the Seman river area, from the estuary to the production areas of oil extraction, identifying main problems regarding the environmental pollution. Moreover, it supplies possible solutions based on biological systems which could improve and / or resolve environmental pollution, such as restoring the natural green areas of the banks with native vegetation (naturalization), phytoremedetion and biological depuration systems. The effects of the biological solutions will result in a reduction of environmental contamination to the benefit of the environmental sustainability. The bioremediation is a very interesting technology in reducing the concentration of organic pollutants (EPA-Guideline, 2005), with a removal rate of 40% from contaminated soils. This study indicates phytoremedetion, hydrodepuration and biological depuration systems as an effective strategy in continuously lowering the rate of chemical and biological contaminants.

Introduction

The Seman river in western Albania, formed at the confluence of the rivers Osum and Devoll, flows west through Fier-Shegan, Mbrostar (near Fier), opening into the Adriatic Sea. The Seman river catchment areas is 5,658 km2, were its length reaches 281 km, and its basin is about 1/5of the Albanian territory. It crosses a large area characterized both by a complicated geological structure, fertile plaines and large urban settlementes (Bogdani Ndini, 2012).
The Seman basin is very large and features several urban and industrial sites, were several drainage channels were built along. The channels present in the northen part are joined by parallel systems and flow into the river, while related to the south river area the surface waters flow to the draining main channel turning from the Seman River.

Nevertheless, the Seman basin also includes a disused mining oil site in Kucova (fig1), terracing agricultural areas and a non-active quarry. The vast agricultural area is evident and characterized by a high fragmentation along the river path; towards the city of Fier with an expanded active mining site (fig2) were the Seman basin flows to its center. The area was characterized by the presence of different urban sites, including the city of Fier. In this area there was also a need in buidling a big channel (fig3), which was supplied by the river and was mainly used for the irrigation of agricultural lands.

Before reaching the Adriatic Sea, the Seman River crosses a very wide humid area, where coast erosion problem are evident along with the traces of oil (Beqiraj et all, 2010), posing many dangerous issues for the actual habitats in the area. Moreoever, pollution problems caused by the river provoke serious damages on its basin, such as: deforestation, erosion, alteration of natural habitats and gravel excavation, use of fertilizers in agriculture, urban discharges, untreated wastewater and especially oil-extraction sites.
As a consequence, the widespread situation of chemical and biological pollution has caused water pollution and erosion in the banks of Seman, where frequent flooding ocours.
Back in 2015, heavy and uninterrupted rains increased the levels of Vjosa, Devoll, Osum and Seman rivers which have inundated their banks, causing severe flooding in several areas, endangering villages, roads and also some major national highways.

Nevertheless, beach erosion is mostly related to natural factors: the corrosive effect of sea waves and especially the sea level rise due to global warming but are also related to human factor; the erection of dams on the river has reduced the feed (deposits) for beaches, disregarding the fundamental role of the river in also maintaining the sea coast (Miho, 2005; Balla, 2012).

According to the Classification of Norwegian Institute for Water Research (NIVA 1997) and Directive of European Community (CEE/CEEA/CE 78/659) for "Quality of fresh waters supporting fish life" a systematic environmental study of the water chemical parameters was presented at the conference of "Environmental Assessment of Water Quality of Albanian Rivers", on the classification of natural waters in Albania. (a). In this systematic environmental study, the main polluting sources are identified, obtaining an classification of a very (low), bad level of the water quality (class 5).
The most critical chemical parameters for nearly all studied rivers found were as such: (a) Total suspended solids (TSS) resulted more than 25 mg/L in many sampling points; caused from the intensive erosion of the land; (b) Nutrient compounds concentration in rivers near big towns. Also, very low content of dissolved oxygen (eutrophic levels) were found in the Ishmi river near the city of Tirana and Seman river near the city of Fier, caused by discharges of untreated sewage wastewaters.
The most polluted rivers referring to nearly all parameters resulted Lana (tributary of Ishmi) and Gjanica (tributary of Semani). (a) The main conclusions of the conference showed that both chemical and biological (parameters for diatoms) results need to monitored through a systematic program in needs of understanding the present environmental state of aquatic ecosystem in order to detect the main sources of pollution and set the basis for political guidelines which could improve the ecological situation.

During site inspection it was verified that the real situation of environmental degradation, was caused by the presence of a large amount of waste especially that of a plastic nature.
Different sources and levels of pollution have been identified in the territory of the river coming from urban areas, resulting from non adatable management systems and disposal of solid urban waste, the presence of plastic material (fig4) and the lack of systematic sewerage.
Moreover, eutrophic levels linked to human contamination (fecal contamination) and non suitable wastewater drain system where more than apparent, putting in risk also human health in the area but also Seman basin.

Indeed the presence of microorganisms, markers of contamination as potential pathogens that may be etiologic agents of disease, is responsible for risks linked to the use of water (drinkable water and irrigation water). The risk of getting diseases caused by specific etiologic agents (viruses, bacteria, protozoa, metazoan) following the use of water is related to its degree of fecal contamination (potential source for transmission of many pathogens).
The chemical contamination includes the high concentration of heavy metals and hydrocarbons derived from oil extraction.
Most samples contained numerous toxic and persistent organic chemical pollutants, as well as very high levels of many toxic metals, as Mercury (Hg), Lead (Pb), Cadmium (Cd), Chromium (Cr). The nature and extent of chemical contamination found at sites in Seman River.
As a matter of fact, different species of the cyprinid fish of the Albanian river, (Barbus prespensis, Oxynoemachileus pindus, Alburnoides bipuntatus, Squalius cephalus and Pachichilon pictum), are used as food despite a high concentration of lead, chrome, cadmium, copper and mercury. In the last several decades the contamination

Fig1 / disused area of oil extraction / source photo by the author
Fig2 / active area of oil extraction / source photo by the author

of freshwaters with various pollutants has become an issue of great concern. Heavy metals are among the major pollutants that also accumulate in organisms and exhibit increased concentrations through the food chain.
The sources of heavy metal contamination derive only partially from natural factors due to the different rock types that may cause different background levels in the biota (flora and fauna) (Shumka, 2014), but they mainly result from industry, landfill of waste and phytosanitary treatments for agriculture.
Health issues from chemical and biological pollution, especially regarding food-borne diseases from pathogenes bacteria (Piro, 2013), can be very significant, as reported by the World Health Organization report "Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks". The environmental risk factors such as air, water and soil pollution, chemical exposures, climate change and ultraviolet radiation, contribute to the onset of more than 100 diseases and damage to health (b). Nevertheless, health-monitoring investigations in territories subject to mining activities show incidence rates from 2 to 2.5 times higher than the regional average of asthma, other severe respiratory conditions, ischemic heart disease and heart failure.

Aim

The main objective of this study is to produce a complete picture of the present environmental situation of the Seman basin, addressing environmental problems caused by human impact and evaluating the effect of new biolgical solutions.
The synergy between the special and appropriate plants and the biodegrading bacteria is the basis of the systems novel-restoring procedure both for the ground that for water.
Evaluate the applicability for restoring water and agricultural land not by natural systems or low- environment impact as a strategy for the reduction of chemical pollution that is economically sustainable and manageable respecting the urban sites and recovering the natural ecosystems.
Spreading information to increase awareness and knowledge of the environmental pollution hazard to human health could promote those systems novel-restoring procedure.

Methodology

The study is divided into two parts: The first one includes the river tour in order to evaluate on site the contamination of various areas of the Semani basin.
The second part aims in building an analysis of the possible environmental recovery projects and depollution though bio-remediation.
Preliminary phase focused in site inspection of the area in order to check the current situation. The observation allowed the research team to confirm a state of environmental degradation, mainly caused by disused industrial sites, activities, and solid waste (plastic) spread on the path of the Seman River.
During the survey, different sources and levels of pollution have been identified in the territory of the river coming from urban

Fig3 / channel built for irrigation source / photo by the author

areas due to the wrong management and disposal of solid urban waste, the presence of plastic material (fig4) and the lack of a systematic sewerage.
The second phase focused on proposing possible solutions respecting the environment and human activities.
The described areas have different problems to which we could propose a restructuring plan to reduce environmental pollution and revaluate the river as a green area to be protected.
The first intervention action should focus on the river bed, through a reinforcement of the levees detention basin, restoring the natural green areas of the banks with native vegetation (naturalization) to compensate for the deforestation and exploitation of the river's natural material.

One of the possibilities is to intervene on the entire basin by enhacing the territorial characteristics (land use changes, broadcast hedges, rows, grassy strips), and the self-purifying capacity of river water (renaturalization, creation of wetlands in the river bed). Creation of zones acting as overflow basins in case of heavy rainfall could protect the urban centers located further downstream using non-active quarry and part of agricultural land located beyond the area of cultivated terracings.
Moreover, the flooding areas may be foster for cultivation (forestry), as the white poplar (Populus alba), used often in wetlands, riparian trees or for energy purposes (biomass). (d)
In this case natural bioremediation system is consider useful: the phytoremediation include the use of plant species for remediation of soils contaminated by heavy metals in particular (Piro, 2013; Tchounwou, 2014).
The biological depuration system can be defined as a natural process for purifying wastewater, using plants as biological filters that reduce pollutants in them with the use of bacteria useful in assisting the organic degradation.
The effect of microbial cleaning, containing spores of food grade for example bacteria spore – forming Bacillus subtilis (fig5).
Microbial cleaning resulted in a reduction in the pathogen load that is stable over time.
Moreover, using microbial or remediation activities systems alternatively are beneficial as, this study demonstrates that microbial cleaning is a more effective and sustainable alternative to chemical cleaning. (f) (g)
Designing a system of constructed wetlands always includes the consideration of several parameters, such as the plant location (geographic location), the conformation of the soil and geology, the amount of rainfall, the chemical status of surface waters and the environmental impact.

Also important is the consideration of ecological diversity in ensuring the presence of a wide range of native plants and animal species; and if possible, increase the number of plant species present, without increasing the presence of species not typical of the area at the expense of typical species.
The projects should include mechanisms to control or eliminate undesirable species.

Fig4 / Plastic waste
source / photo by the author

The phytodepuration system is one way of spreading pathogenic microorganisms to the water of the rivers, mainly from untreated urban discharge, which flow directly into the rivers without any previous treatment. Phytodepuration is an effective treatment for domestic sewage, which exploits the evapotranspiration of the soil and vegetation.

Still, phytodepuration systems have been developed utilizing the aquatic plants (macrophytes), in reproducing natural purification processes typical of humid areas. In this case, macrophytes can be floating, flooded or emerging. The systems can have superficial or sub-superficial streams, were sub-superficial stream can be horizontally or vertically oriented. Superficial streams support all the types of macrophytes, were sub-superficial ones only enhance the emerging macrophytes, including here the use of plant species for remediation of soils contaminated by heavy metals.

So in this case, the cause of environmental contamination by heavy metals can be redistributed by natural geological and biological cycles (soil formation processes). However, the principal cause of heavy metal pollution is linked to human activities (industrial, combustion processes, agriculture).
Biological treatments include bioremediation (microorganisms against organic pollutants) and phytoremediation (using plants against organic and inorganic pollutants) (Manno, 2010).
Phytoremediation is a technology that employs plant species for "in situ" treatment of soils, sediments and contaminated water and is the process carried out by plants able to degrade organic and inorganic contaminants. It is based on different biological processes such as phytodegradation (or fitotrasformazione), phytostabilization, phyto-volatilization, phytoextraction, rizo-degradation (degradation of organic contaminants by microbial which is present in the rhizosphere of the plant) and rizo-filtration (Vamerali, 2012).

According to theoretical recommendations from the literature regarding this topic, recommendations regarding phytoremediation is seen as a useful program including: the correct selection of plants, the characteristics of the territory and type of pollutants, the capture rate of the contaminant and the recovery time.
Laboratory interest using pot experiments (phase preliminary “in vitro”), have both evaluated the efficiency of each type of plant in the extraction of the pollutants that monitor the concentrations present in the contaminated soil and in the plant (Ventorino, 2012; Peer, 2003).

Heavy metals are not degraded, but are extracted from the soil and accumulated in plant tissues or immobilized in the rhizosphere of plants. This proposal for a phytoremediation should include the reusable parts of the plants and their eventual disposal, so they could be used for energy purposes derived from biomass or as thermal insulation of buildings.

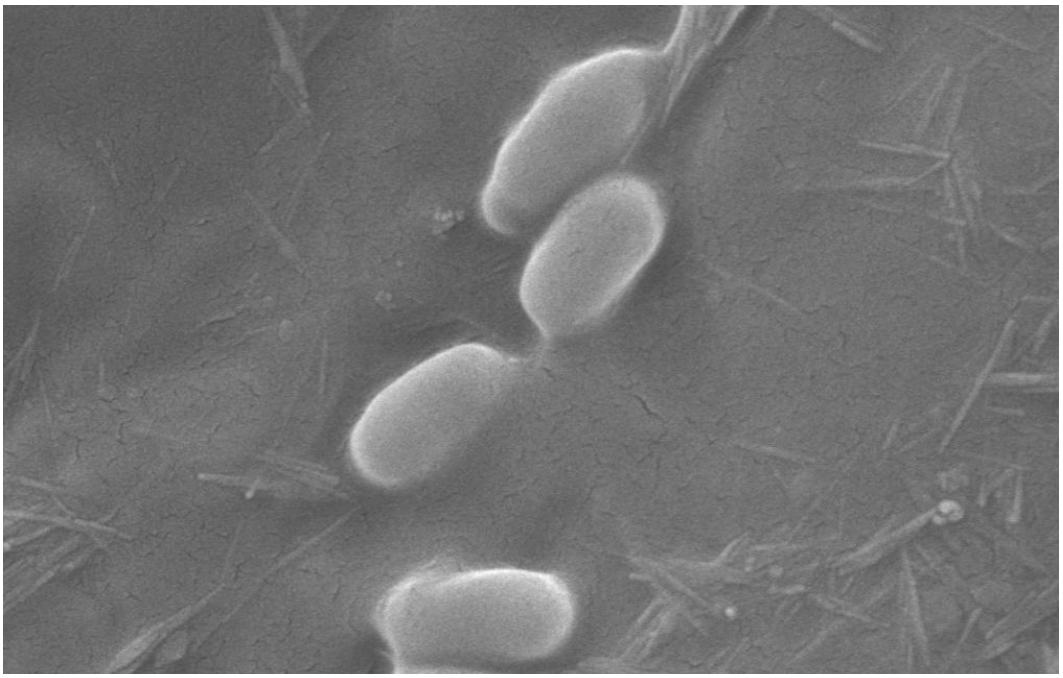

Fig5 / bacteria spore – forming Bacillus subtilis
source / photo by the author

Nevertheless, other plants can be used in the rehabilitation and environmental remediation of polluted land, each corresponding to a specific feature extraction, such as vetiver (Chrysopogon zizanioides), hemp (Cannabis sativa), wild sunflower (Helianthus Rigidus) that absorb nickel and chromium. The most efficient plant species iperaccumulatori belong to the Brassicaceae family (Thlaspi caerulescens, Thalaspi rotundifolium, Alyssiumwulfenianum, Brassica juncea), the grasses (tall fescue). This species often experiences a slow growth and have low biomass, thus typical agricultural species may be used in representing a minimum accumulation of heavy metals and high biomass (eg. sorghum (Sorghum vulgare), corn (Zea mays), sunflower (Helianthus annuus) and alfalfa (Medicago sativa)) (Lievens, 2008; EPA, 2000; Grispen, 2006).

Results

The effects of the biological solutions will result in a reduction of environmental contamination to the benefit of creating sustainability.

The cultivation of poplar, as the white poplar (Populus alba), can allow bioremediation due to the ability to absorb and accumulate a considerable amount of metal in its tissues during its life cycle, used in the production of bioenergy.

In addition, the cultivation of plants in symbiosis with nitrogen-fixing microorganisms and mycorrhiza can positively affect soil fertility in terms of supporting agriculture through additional incentives for the agricultural economy. (d)

A very interesting technology, Bioremediation reduces the concentration of organic pollutants (EPA-Guideline, 2005), with a removal rate of 40% from contaminated soils. (f)

However, setting up this technology requires a long time due to its connection to the growth of the hyper accumulator plants and the slow degradation caused by the harsh environmental conditions, influenced by the efficiency of the natural system with high values of toxins of the terrain, but after decontamination the quality and the appreciation of the soil after contamination are higher.

The natural method is considered more safe, enhancing a long-term sustainable (EPA, 2000).

Discussion

According to the "Environmental Assessment of Water Quality of Albanian Rivers" conference, the water quality parameters and heavy metal levels monitored during 2002-2004 on eight tours along the most impacted rivers of the Adriatic lowland, including here Seman river with its effluents Gjanica and Osumi, and also the Seman basin, lead to the conclusion that phytoremediation is an appropriate technology for environmental recovery. (a)

In fact, the study conducted in the Seman area, reassure that the chemical and biological issues could find some biological solution, considering their impact on the environmental sustainability and ethical development in the Seman area which is rich in water, interesting habitat for the flora and fauna, and its biodiversity.

Hence, Phytoremediation is a low-impact

economic system: low costs for the plant, including trenching, inactive waterproof material for draining, piping, purchase of trees and re-usable soil cover are inexpensive, thus no need for further manufactures, or electrical equipment.
Low costs for the management includes low-limited electric consumption due to absence of electrical and mechanical apparatus and the presence of air-insufflating system; where there is no need for chemical reagents nor of specialised workforce or sludge production.

Conclusions

The widespread presence of contaminated areas create incentives in finding effective and sustainable remediation techniques both economically and environmentally compared to previously used remediation techniques which have not solved the problem of pollution.
This study presents biological solutions based on different systems using various vegetable plants and microorganisms with repair capabilities for improving the environment of the Seman basin contaminated by human activity.
Phytoremediation includes solutions that contextually allow exerting the action of removing the contaminants from the water and the soil and rebuilding natural-looking environments.
The phytoremediation technology can be applied to the resolution of a wide range of environmental problems such as secondary or tertiary civil waste water purification; industrial waste purification; treatment of certain liquid wastes (such as landfill leachate); elimination of widespread pollutants; remediation of contaminated soils (phytoremediation); and river system and flood protection.
Phytoremediation is a technique which is suitable for the remediation of large areas with contamination both in terms of depth (the plants take roots to a maximum of 3 meters) and in entities, since plants have limited efficiency and can be subject to toxic effects, which do not allow the colonization of environmental problems caused by infestation of non-autochthonous plants and thereby adversely affect the territory's biodiversity.

This "green" remedy, beside having a low-environmental impact (environmental sustainability), and lower cost compared to other treatments (savings in terms of materials' construction and shipbuilding works) has both the ability to reuse the contaminated plants as a way of energy recovery (the use of contaminated soils for sustainable production of biomasses for energy) and the advantage of the wellbeing of the local community (Zhan, 2013; Alkanok, 2014; Verma, 2007; Aguilar-Virgen, 2014).

This proposal of the phytoremediation system may be inserted into a nature protection program and biodiversity, according to the specific directions laws and European guidelines (EU), (such as Directive 92/43 / EEC - "Conservation of natural habitats and of wild fauna and flora" (5/21/92) and "Biodiversity Action Plan for the conservation of natural resources".

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Fig6 / Plants used fot phytoremedation: sorghum (Sorghum vulgare), corn (Zea mays), sunflower (Helianthus annuus) and alfalfa (Medicago sativa) / source Alberta Vandini

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OILANDSCAPES / Coupling ecological and social dimensions with oil infrastructures in Adriatic-Ionian region

keywords / oil industry, landscape, infrastructures, territorial transformations

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Abstract

The aim of the paper is to explore the potential of oil industry landscapes if 'coupled' with new socio-ecologic realms, for the definition of a innovative local development processes. It will lead the reader in understanding, firstly, the conceptual transition from previous 'oil infrastructures' to 'oil meshes', necessary to set the analytical and designing scale of our proposed OILANDSCAPES. Starting from the assumption that 'oil infrastructures' have always played an important role in the definition of the stratified territorial morphology and that can be considered as cultural heritage because of their socio-cultural values, in the first part the paper focuses on the definition of three kinds of oil landscapes: upstream, midstream and downstream landscapes. Then, it leads the reader's attention on 'oil infrastructures' concept which is tightly related to an engineering approach in territorial planning. In the second part, the paper wants to introduce the suggested transition from 'oil infrastructures' to 'oil meshes' concept, supporting the idea that these three kinds of landscape have to be studied as a unique realm, so enlarging our point of view towards the territorial scale. After, the paper introduces the two current issues which are differently affecting oil industry on the Western coasts of Adrion region and on the Eastern ones: the crisis of the downstream sector in the first case, and the increasing in exploration and production oil activities in the second one. The effects of these local and regional dynamics will influence the territorial 'oil meshes' in their entirety. Therefore, 'oil meshes' are questioned to be responsive to a de-engineering reconversion process in one case and to be sensitive to innovative planning tools in the other one. In the third part, two case studies, representative of the opposite outlined current trends, are identified thanks to their concentration of oil infrastructures: the South-Eastern Sicilian oil district (Gela-Ragusa-Syracuse) in Italy and the Myzeqe plain oil district (Fier-Patos-Marinza-Ballsh-Kucova) in Albania. The two oil regions, defined by a 130x130 km area, are comparatively analysed thanks to some thematic GIS cartographies. In the conclusion the paper evokes the socio-ecologic potential for local development processes of our shaped 'oil meshes' in defining new urban and ecologic centralities. Some results of the IDAUP PhD workshop in Tirana have been taken as examples to briefly sketch how we could imagine new possible scenarios for 'oil meshes' only coupling them with socio-ecologic territorial strategic vision. In this sense the paper proposes to 'explore the new domain of OILANDSCAPES'.

Oil infrastructures: between 'palimpsest' and 'milieu'

According to André Corboz, 'territory as a palimpsest' is meant to describe morphological territorial transformations as the result of natural and human processes of stratification (1983). The industrialization process itself has always been carrier of some productive patterns and infrastructures, being one of the principal organizers of contemporary urban landscapes (Castells, 1973).
In particular from the end of XIX century, oil represents a 'critical agent in shaping

Fig1 / Upstream oil sector in Albania: Kucova drilling wells (in the white circles) / source Google Earth)
Fig2 / Upstream oil sector in Albania: pattern of Patos-Marinza horizontal wells / source Google Earth

global geographies – urban, rural and maritime - through physical infrastructure at major production sites, along networks of consumption, and through intangible, international flows of the finances, people, and ideas that sustain it` (Hein, 2013, p.437).
Thanks to their sediment material and immaterial components, we assume that on-shore oil infrastructures, being descriptive of a specific socio-economic context and of a work cultural know-how, may be counted as part of our historical and cultural industrial heritage, in this sense, they represent an opportunity for the construction of a competitive local development process.
These considerations allow us to associate to our morphological study, based on the interpretation of material and physical elements as proposed by 'palimpsest', a broader and immaterial realm by using 'milieu' concept to describe the specific socio-cultural values of the industrial cultural heritage (Governa, 1998).

According to a first morphological analysis of oil infrastructures, it is worthy to subdivide them in three major sectors of the oil industry, each of which corresponds to a peculiar landscape:

1. upstream oil sector matches with exploration and production stage. Spatially speaking, conventional oil extraction is characterized by typical drilling wells, which punctually harvest huge surfaces (fig.1). The recent wide diffusion of new extraction technologies for conventional and non-conventional oil, such as horizontal wells, contribute in changing the usual vertical petroleum landmarks into flat surfaces, which scatter satellite images in a very peculiar manner (fig.2);

2. midstream oil sector includes transportation activities of crude oil through different infrastructures (oil pipelines, rails, highways or waterways). It also involves storage and marketing activities for the delivery of crude or refined products to downstream distributors. Crude oil pipelines normally lie in the subsoil and they are materialized on the surface by non-building buffer zones. According to Neeraj Bhatia (2013, pp. 274) pipelines are the interface between the territorial scale and architecture;

3. downstream oil sector comprises the refining of crude oil activities and the processing of derived products. Refineries and petrochemical plants are the industrial architectural materialization of these processes. They represent huge surfaces, which normally lie near watercourses and seaports, because water is a fundamental element for their functioning and for shipping facilities. These sites are characterized by the presence of high chimneys, storage tanks, highly technological and specific buildings, artificial water basins and huge voids. A particular dense network of mobility infrastructures can be found in their proximity for a multimodal logistic organization.

The principal consideration which emerges from this morphological analysis is related

to the territorial influence of onshore oil infrastructures, based on functional interconnections among the three landscapes and on their physical distance. The potential of oil infrastructures resides in considering them as a whole, as 'territorial meshes'. Thus, the paper means to deepen how these 'oil meshes', if considered as cultural heritage in the sense of 'milieu', could be an organizing support for the definition of a local development process.

Oil meshes: questioning the role of energy infrastructures

Talking about oil industry is talking about infrastructures, in every of their declinations. As Ruiz (2013, pp. 68-79) and Bhatia (2013, pp. 273-286) assert, in XX century we assisted to a disruptive detachment between engineering and architecture disciplines. In this subdivision of competences, infrastructures belonged to civil engineering domain by completely abandoning design issues. Only recently architecture and landscape architecture have understood the importance in reintegrating infrastructures as a multi-scalar design challenge, infrastructural scale that contemporary urban and territorial challenges can be faced through an enlarged and long-term strategic planning vision. The reintegration of infrastructures' domain in architects and landscape architects' competences thus would allow them to intervene on and manage social and environmental realms from a broader point of view, reconciling contemporary architecture potential with its historic relationship to the city (Waldheim 2011, pp. 4-5).
In this context, the current shifting of energy infrastructures' policies from centralization to territorial distribution could be pivotal in the definition of their new territorial role in optics of a competitive local development, as its relationship with cultural heritage reveals practices of re-invention of territories (Bourdin, 1984). In this sense, we assist to an epochal transition from the notion of 'territory as a resource to be exploited through infrastructures' to the one of 'territory as a non-renewable resource to be valorised through landscape'. The choice of using the two terms 'infrastructures' and 'landscape' is not accidental, but lies on some Bélanger's theoretical assumptions (2012): landscape is infrastructure (think at rivers in example), but if the first unites, the second one, in their engineering meaning, separates.
The centralization of energy consumption lies on the assumption that no matter what energy resource has to be harvested from the soil and processed in more or less close huge productive sites, but normally far from urban settlements, to then be distributed in a wide-ranging region through energy infrastructures that only cross territories, without returning anything to local communities except for creating spatial separation.
Following on Ruiz's and Bhatia's enquiry: if infrastructures have been planned as technical objects, how could they be redesigned by architecture to become flexible for other uses? Using Bélanger's terms: how design could de-engineer existing infrastructures?

In this quick-sketched energy production framework, it is necessary to deepen why are we questioning about the future role of oil infrastructures, if we actually still live in a mostly oil-based energetic culture. We are aware that there are some different theories about the future of our oil-based economy, we can briefly summarize as follows:

1. the peak oil theory, by Marion King Hubbert (1956) asserts that it is possible to predict the extraction dynamic and the 'peak oil' of maximal oil production which stands as the beginning of production decreasing. The peak oil theory assumes that the decline of oil production is not necessarily due to the complete physical exhaustion of the hydrocarbon reserves, but it is mostly due to the unsustainable augmentation of the costs for the extraction (Bardi, 2013);

2. the detractors of peak oil theory affirm that this theory is only based on geologic and extractive data, ignoring that oil production is also influenced by social and technological progress. Even if world oil consumption has increased, exploitable predictable reserves have not decreased thanks to new and more efficient extraction techniques and to a broader social environmental sensitivity (Maugeri, 2012). So, oil era will not end because of oil scarcity but because of the development of more convenient energy sources. As to electric energy production, for example, oil has already been substituted by natural gas and renewable energies, while it remains the unique significant energy source for mobility industry (Zuliani, 2015);

3. the Energy (R)evolution scenario, proposed by more radical wings of no-profit organizations (i.e. Greenpeace), describes how global energy supply has to move to a mix of renewable energy

Fig3 / Midstream oil sector in Albania: Ballsh oil pipeline / source Bing Maps
Fig4 / Downstream oil sector in Italy: ENI Gela refinery oil plant / source Bing Maps
Fig5 / Downstream oil sector in Italy: LUKOIL Priolo Gargallo refinery oil plant / source Bing Maps

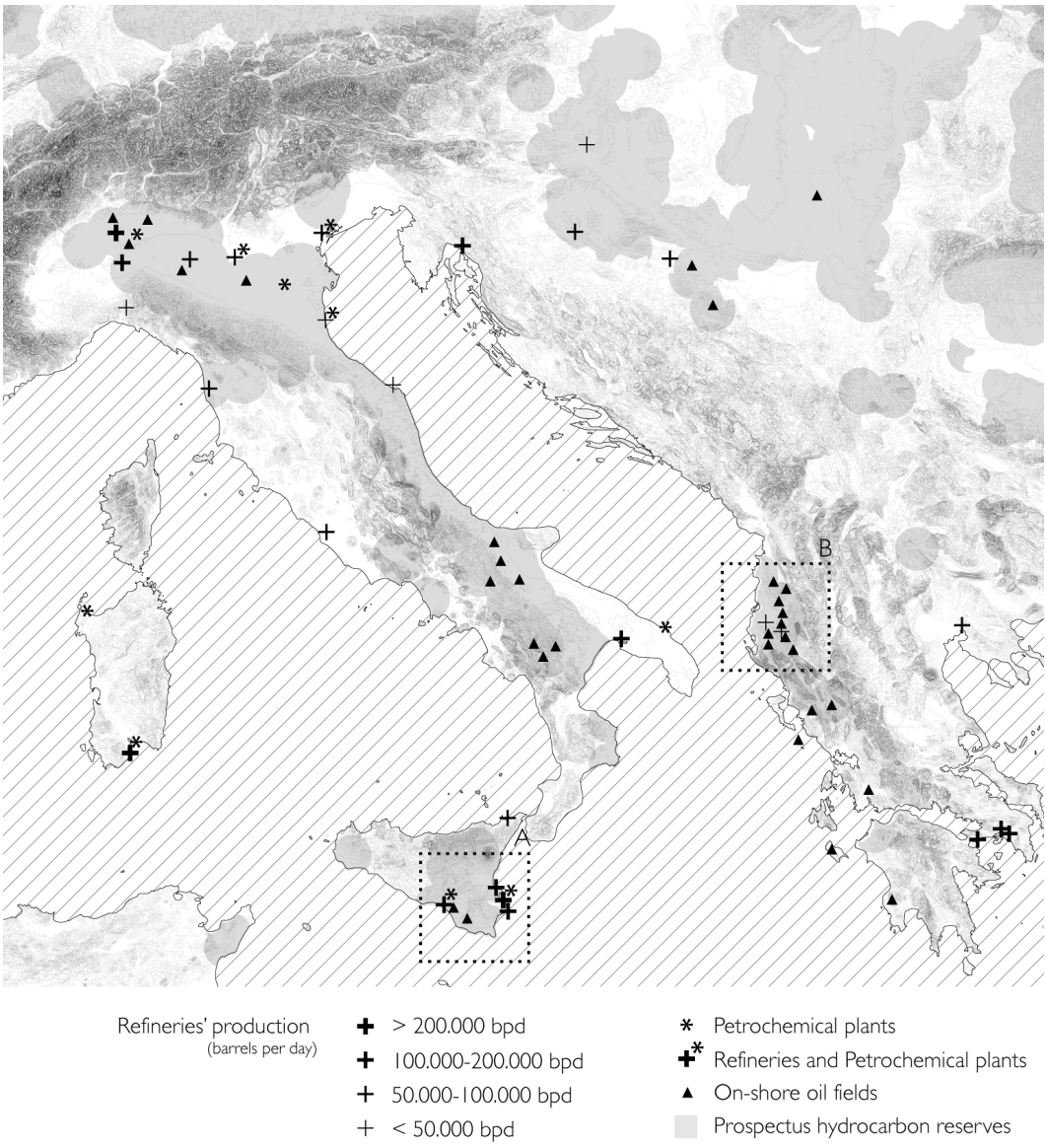


Fig6 / ADRION oil meshes: A_ Gela, Ragusa, Syracuse; B_ Fier, Patos-Marinza, Ballsh, Kucova - elaborated by the author through GIS mapping tools, WGS84/Pseudo Mercator – EPSG: 3857 sources / Prospectus hydrocarbon reserves: https://www.prio.org - Petroleum Dataset v1.2; Refineries location and productivity: http://globalenergyobservatory.org; On-shore oil fields location: Wikipedia – Oil fields in Italy, Slovenia, Croatia, Serbia, Albania, Greece.

sources (i.e. ocean energy, solar thermal, geothermal, biomass, photovoltaic, wind power, hydropower) to abandon carbon fossil sources exploitation by 2050 (Greenpeace, 2015).

The above reported theories could act as a starting point for future macro-economic oil policies, but certainly local challenges are fundamental for strategic decisions referred to oil infrastructures.
In a near future we are going to face two different issues of oil industry: a progressive contraction of downstream activities or a flourishing implementation of non-conventional oil production.
In particular, inside our chosen geographical framework, defined by European Union as Adriatic-Ionian region, it is possible to recognize two opposite issues for future petroleum industry. In fact, if on the Western coasts of Adriatic-Ionian region the high-cost of energy and very restrictive environmental laws are causing structural problems in a consolidated downstream sector, on the Eastern coasts, instead, problems are connected with a recent expansion of the extraction horizons.
Both in the case of dismissing or implementation of oil infrastructures, the territorial strategic vision for a local development process could be supported by the changing perspective about energy infrastructures from a centralized territorial energy consumption towards a territorial distributed energy production. From an energetic point of view, 'oil meshes' intersect several territories and could differently interacts with local characteristics for a specific production of alternative renewable energies.

Adrion oil meshes: case studies

Two interesting case studies along Adrion

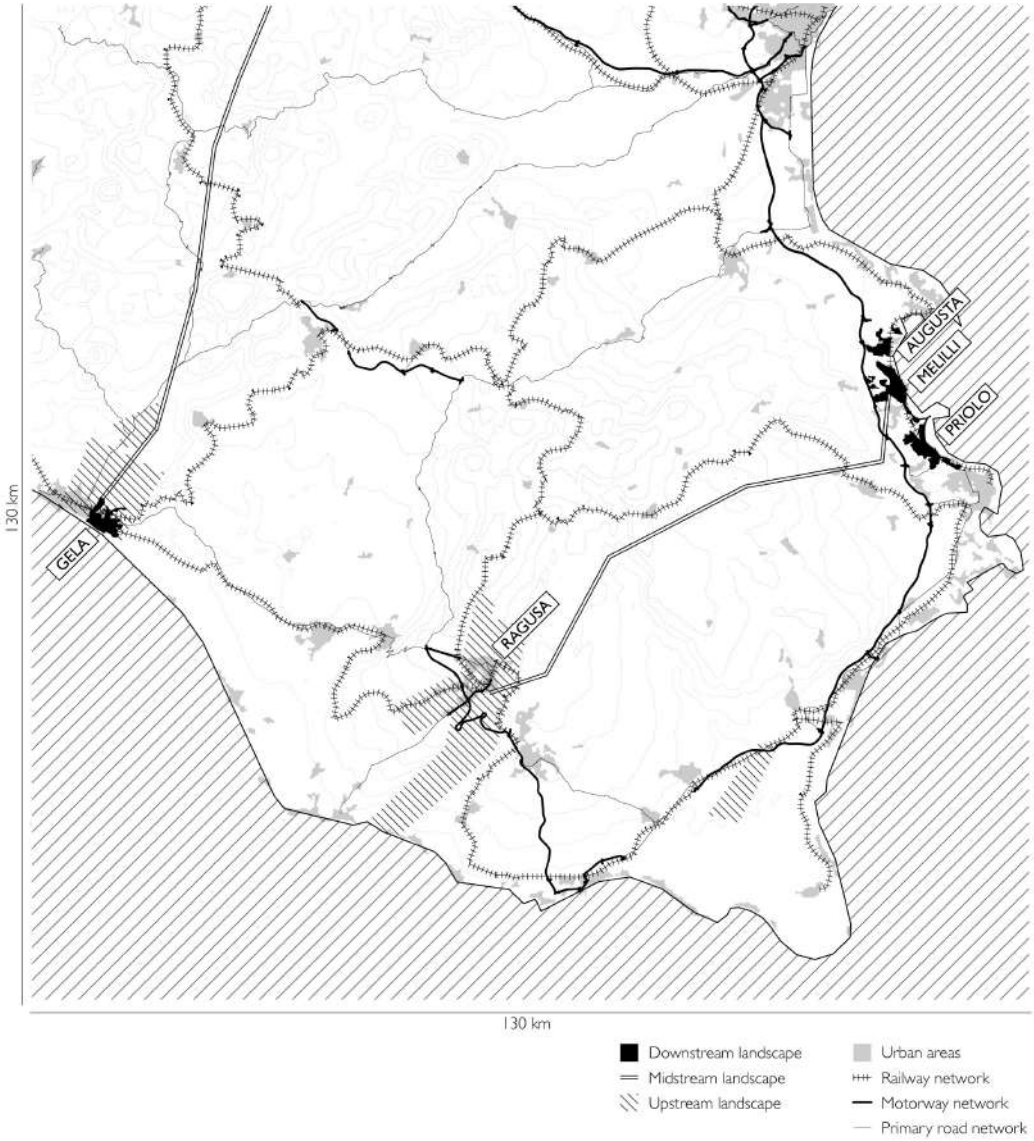


Fig. 7 / The South-Eastern Sicilian oil district - elaborated by the author through GIS mapping tools, WGS84/Pseudo Mercator – EPSG: 3857
sources / Urban areas and Downstream landscape: www.eea.europe.eu - Corine Land Cover; Midstream landscape: ENI factbook 2014; Upstream landscape: Ministero italiano dello Sviluppo Economico - http://unmig.mise.gov.it; Transportation networks: http://www.diva-gis.org/gdata.

coasts can provide us with useful elements regarding potential of oil infrastructures' influence on local development, focusing on the remarkable differences between Western and Eastern Adrion Region oil settlements. In particular, the two cases do stand for a high concentration of oil infrastructures in an area of 130x130 km, analysed through GIS mapping tools: the Sicilian case study (Gela, Ragusa, Syracuse) and the Albanian one (Fier, Patos-Marinza, Ballsh, Kucova).

1. Adrion Western Italian coasts: after the crisis of the downstream sector

Italy, due to its strategic geographic position easily accessible from North African and Middle East countries, imposed itself until '90s as one of the principal European leader in refining and petrochemical sector.

The present crisis in downstream oil sector is due to some structural reasons, such as (Oliva, 2014):

- the stagnation in demand of derived oil products on part of Western countries;
- the presence of foreign competitors with less restrictive regulations concerning environmental matters and lower energy costs;
- the reduced size of downstream plants preventing any advantage from the economies of scale;
- the unstable geo-political situation of the main suppliers of crude oil;
- the depression of fuel consumption.

The South-Eastern Sicilian oil district is one of the most significant oil regions in Italy. In a very concentrated 130x130km area, comprised between Gela and Syracuse, oil infrastructures have shaped one of their most relevant expressions. The three typical oil industry landscapes unfolding on those territories are (MISE,

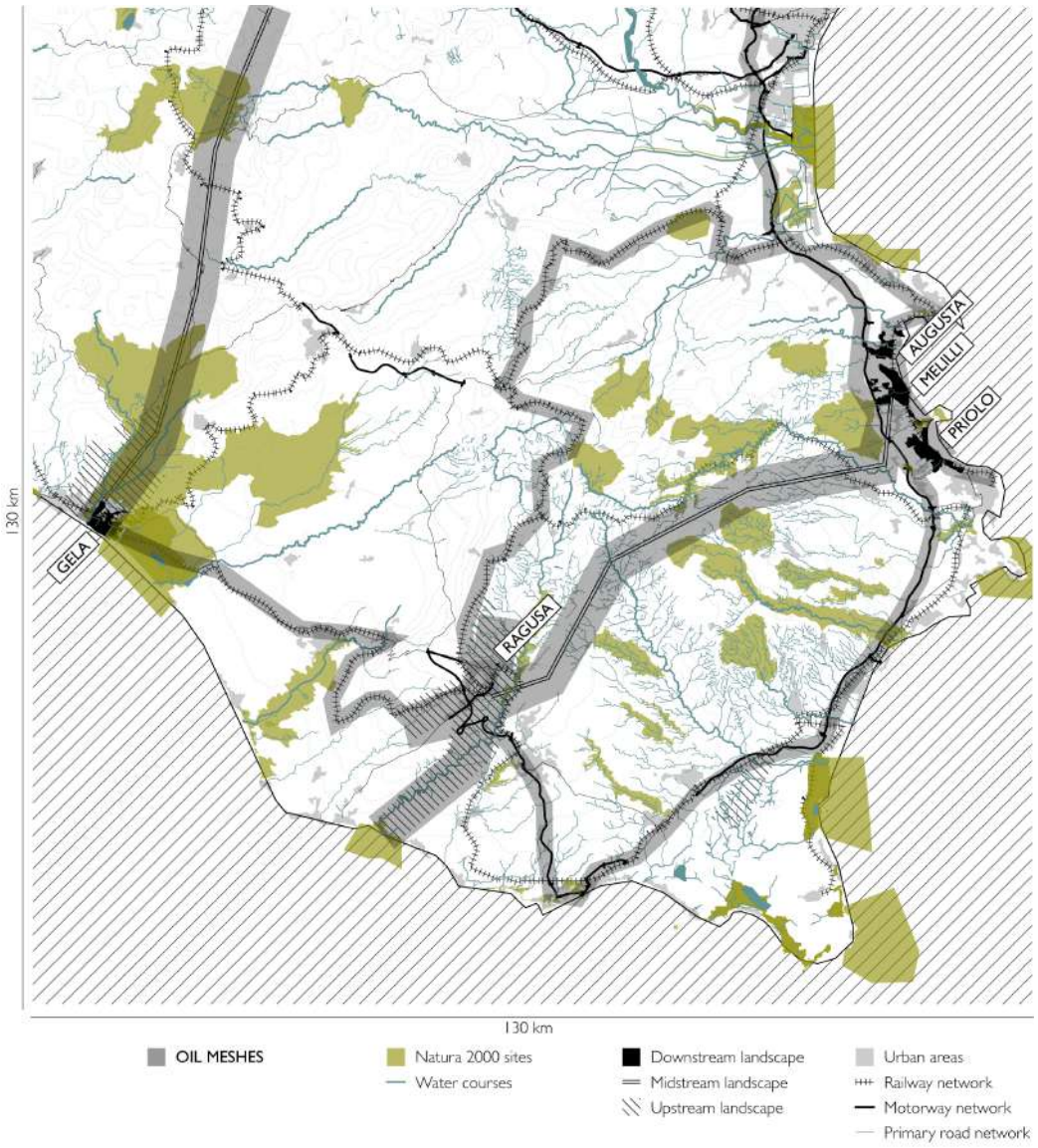


Fig8 / The South-Eastern Sicilian OIL MESH and its social-ecological potential - elaborated by the author through GIS mapping tools, WGS84/Pseudo Mercator – EPSG: 3857 sources / Urban areas and Downstream landscape: www.eea.europe.eu - Corine Land Cover; Midstream landscape: ENI factbook 2014; Upstream landscape: Ministero italiano dello Sviluppo Economico - http://unmig.mise.gov.it; Transportation networks and watercourses: http://www.diva-gis.org/gdata; Natura2000 sites: www.eea.europe.eu - Natura2000 sites

2015):
- upstream onshore sector, mostly concentrated in two principal portions of the territory (Ragusa and Gela), has been explored since '30s, while new huge areas could be interested by new explorations;
- downstream sector consists of four refining and petrochemical poles, one in Gela, and the other 3 between Syracuse and Augusta;
- oil midstream infrastructures (crude oil pipelines) unfold from the Central Sicilian oil and gas fields of Gagliano Castelferrato to the Gela refinery, and from the Ragusa oil fields to the petrochemical plants located near Syracuse (Augusta, Priolo and Melilli).

At the end of World War II, Sicilian economic and social situation was catastrophic, so a big national industrialization development plan incentivised the settlement of highly technological industries in South-Eastern Sicily, completely reshaping their morphology (La Rocca, 2010; Renda, 1987). Doubtless, the cultural context in which these oil infrastructures were mostly settled was less receptive to environmental issues than how we currently are: refining and petrochemical infrastructures were located in very fragile environments, even adjacent to protected areas (i.e. Natura 2000 sites), or were even situated in the proximity of important cultural heritage sites (in Syracuse they have been settled on archaeological Hellenistic sites, such as Thapsos, Megara Hyblaea).

These economic development policies generated a sort of fragile 'oil district', ecologically and socially speaking, which

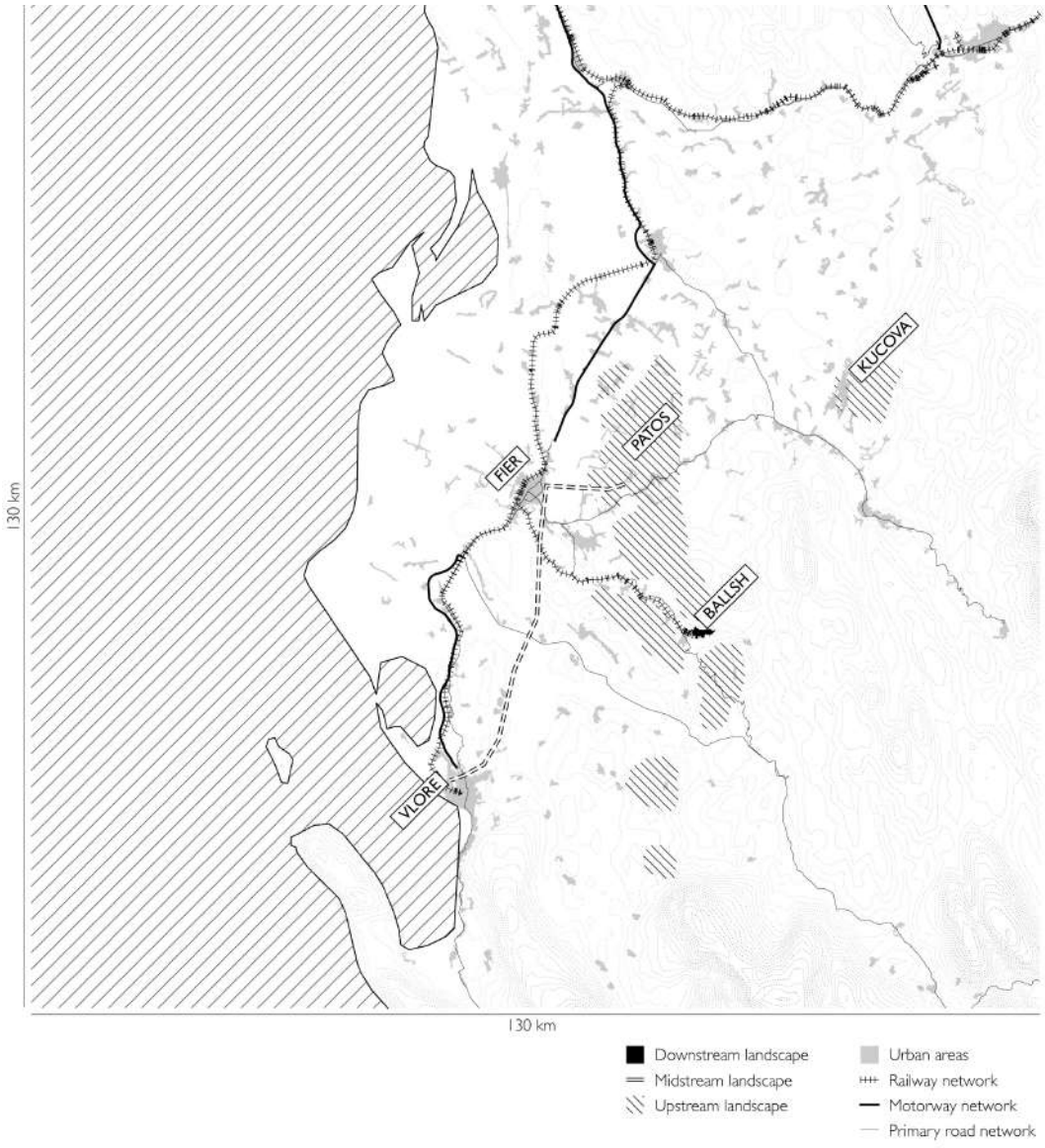


fig. 9: The Myzeqe plain oil district - elaborated by the author through GIS mapping tools, WGS84/ Pseudo Mercator – EPSG: 3857 (sources / Urban areas: www.eea.europe.eu - Corine Land Cover; Midstream landscape: Bankers Petroleum; Downstream landscape: http://www.diva-gis.org/gdata; Upstream landscape: Bankers Petroleum, Petromanas Energy; Transportation networks: http://www.diva-gis.org/gdata

heavily influenced the work culture of local people and the regional economic development until the current Western European downstream crisis.
Thus, the industrial mono-functionality of these territories didn't make them adaptive in front of external changes during crisis periods, creating social tensions and unemployment, disintegrating the widespread cultural know-how related to oil work culture. Even the response for Gela site's dismissing process lacks of a long-term perspective and is approached from a traditional engineering point view: in fact, it has been proposed as a productive reconversion of the historical Gela refinery into a 'bio-refinery' just to reduce an imminent unemployment rate and avoid environmental problems generated by the abandonment of an industrial brownfields without remediation. This kind of technical answer aims in hiding the real problem, that of oil infrastructures, short lasting due to the energy transition, where there is the need to look at them as infrastructures that must ecologically and socially compensate what they harvested from territories which are hosting them. Thus, the Sicilian 'oil mesh' could be interpreted as a 'milieu' through which efforts should be made up in order to set up a local development process which could allow territories to invest in several realms (from alternative renewable energy production to tourism and services), offering a wide range of jobs, breaking the previous regional industrial mono-functionality typical of 'industrial districts' and converting infrastructures in open systems which interact with communities.

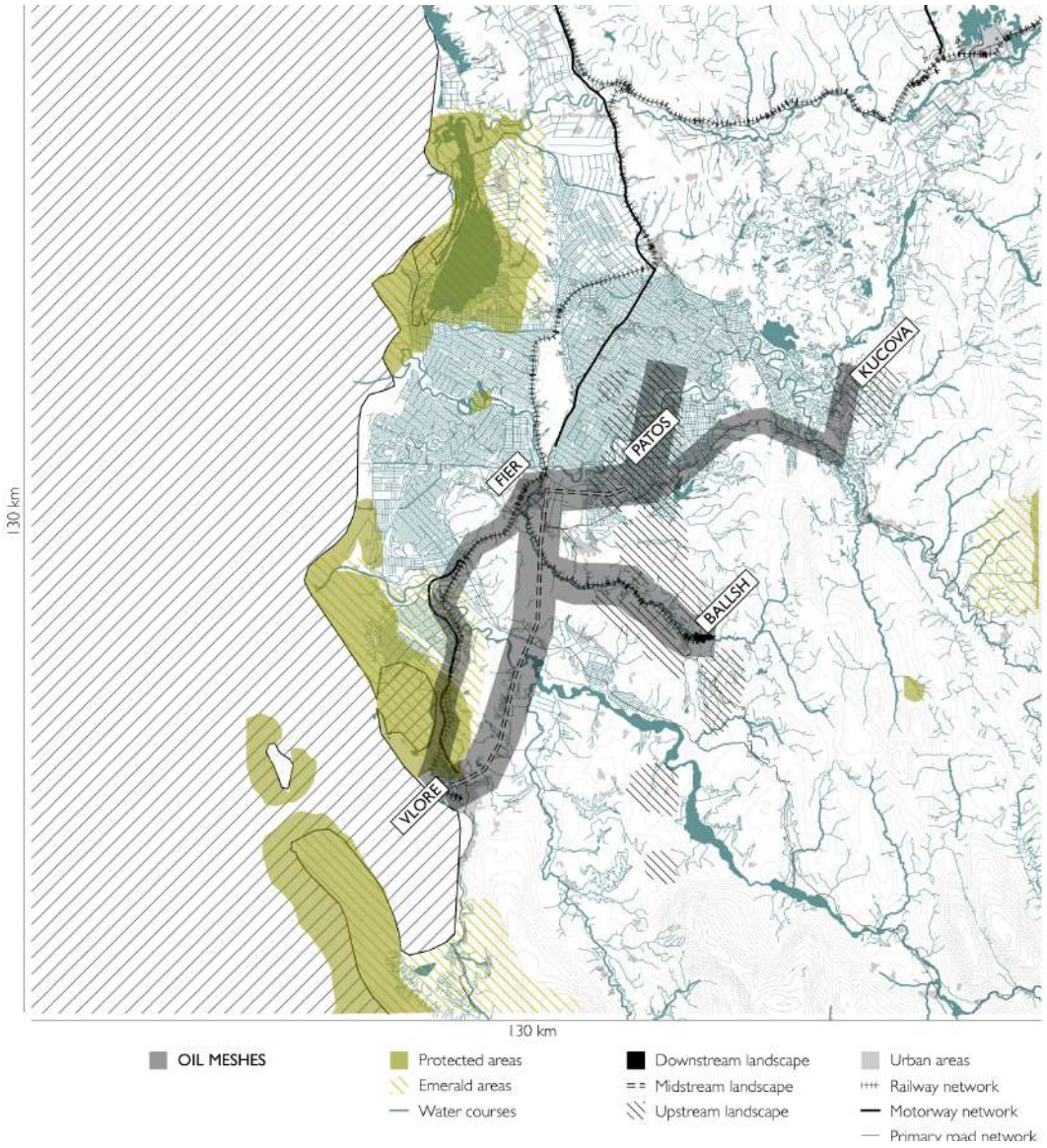


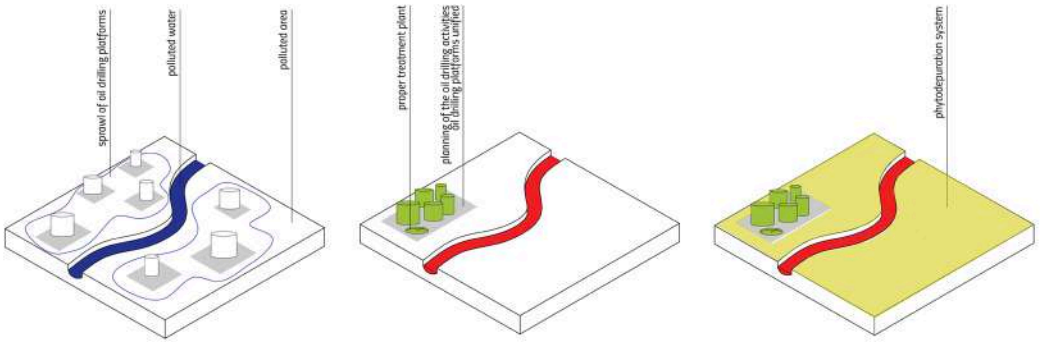
fig. 10: The Myzeqe plain OIL MESH and its socio-ecological potential - elaborated by the author through GIS mapping tools, WGS84/Pseudo Mercator – EPSG: 3857 (sources: Urban areas: www.eea.europe.eu - Corine Land Cover; Midstream landscape: Bankers Petroleum; Downstream landscape: http://www.diva-gis.org/gdata; Upstream landscape: Bankers Petroleum, Petromanas Energy; Transportation networks: http://www.diva-gis.org/gdata; Water courses: furnished by Co-Plan, Polis University; Protected areas and Emerald areas: Albania 2030 Manifesto)

2. ADRION Eastern Albanian coasts: expansion of upstream oil activities

Until World War II, the Myzeqe plain was characterized by unproductive swamps and wetlands, but after the massive drainage works during the communist period, the Myzeqe plain is better known as the 'Albanian granary'. The plain is crossed by some important natural infrastructures, such as the Vlorë, the Seman and the Vjose rivers. The area is also rich in oil fields, which have been firstly explored during the '20s but never fully-operating (Patos-Marinza and Kucova oil fields). The Patos-Marinza oil field is considered one of the most extensive and richest onshore oil reserves in Europe.

We can try to geographically locate the different landscape morphologies related to three main oil sectors:

- in Kucova and in Patos-Marinza, as mentioned above, we can find some upstream landscapes, very different between them. In fact, in Kucova we recognize the presence of old and non-operating vertical drilling wells, dislocated in private and public voids, intermingling with dwellings. On the contrary, in Patos-Marinza oil fields, are more recent drilling horizontal wells scatter the agricultural pattern creating a very peculiar network;
- downstream sector is not so developed in Albania. Only in Ballsh, along the Gjanica river (a Seman's tributary) it is possible to find an obsolete and polluting oil refinery;
- midstream infrastructures are not pervasive in this region. An ancient over ground crude oil pipeline connected Kucova oil wells to Ballsh refineries and only recently some Canadian investments has foreseen in improving the capacity of loaded oil in Vlore harbour connecting



2 / Oil drill activities /

Description / In order to avoid the land consumption in the oil extraction areas, equipment and oil tanks should be placed in a more dense sites, away from the river, in order to create an area of phytodepuration inside the vacant areas.

How to do that?
Regulation Codes / The Government should provide regulation on Oil drill extraction areas in order to create exclusive areas for better management of health security.
Capacity Building / Creation of a Specific Agency for Oil Extraction Areas that will monitor the public health impact in the surrounding municipal areas.

Fig11 / Oil drill activities toolkit
source / PhD international workshop students

it with Patos-Marinza oil fields. To underline the strategic importance of the area, the territory also provides a railway connection which links Ballsh refinery to Vlore harbour, constituting an exception in the very weak Albanian railway network, which principally runs parallel to the coastline, and not in the internal areas.

In Albania, the oil panorama is less developed than that of Western Europe, but it is more dangerous from an environmental point of view. It is likewise set near watercourses (the Gjanica river is the most polluted river in Albania because of the petroleum waste in Patos-Marinza and in Ballsh), so affecting the agricultural, herding and fishing activities. Meanwhile, Albania cannot refuse the opportunity from its rich hydrocarbon reserves and is willing to allow foreign investments to increase oil production. This favourable developing situation in a context free from EU restrictive environmental legislation could cause big environmental risks.
Thus, Albanian backwardness in oil sector does not allow us to argue upon an 'oil industrial district' where there is still lack of a widespread work cultural know-how in the domain. In this case, we cannot argument our territorial interpretation under the socio-cultural value of recognizing oil infrastructures as a 'milieu', but here the future of oil infrastructures has yet to be written in a cultural context, sensitive to environmental issues and it may not be so dangerous if integrated right away with future local development which tries to match agricultural land uses with energy ones.

Conclusions: coupling oil and landscape

If the very question for Western Adrion oil sites stands in the way of how we can de-engineer oil infrastructures, the principal question in Eastern Adrion ones could investigate the right approach on how we can design them as 'landscapes' by integrating responsive strategies to environmental, energetic and socio-economic challenges and not as infrastructures?

Oil meshes' potentiality lie in their territorial component, allowing them to be interpreted as supports for territorial organization of new urban or ecologic centralities, re-shaping and structuring of 'sprawl' territories, of that 'Horizontal Metropolis' which is an energetic, ecological and social renewable resource (Secchi, Viganò, 2012).
During the International PhD Workshop 'When a river flows into the sea' (Tirana, Polis University, 22-28 January 2016), IDAUP PhD students have been asked to sketch a viable scenario for a local development process of the Seman watershed.
Already proposed 'toolkits', constituted by operative actions and regional policies, for the main problems are affecting this watershed and oil pollution was one of them.

The national development strategies enhanced and suggested by 'Albania 2030 Manifesto: a national spatial development vision' (Aliaj, 2014) predict the Myzeqe region as an 'agricultural and energetic Albanian granary'. Following on

this forecast, PhD students have tried to interpret 'oil meshes' as a support for merging energy land uses and agricultural ones in a more responsive way, aiming towards a polyvalent energy production in an contemporary energetic transition.

Nevertheless, the territorial strategic vision foresees the coexistence of extractive activities with agricultural biomass plantations in the same area. Some cultivation, like sunflowers, which do hold phytoremediation capacities, allowing them to remediate soils through the absorption of hydrocarbons. The dismissed chemical factories in Fier, considering their favourable location along the Gjanica river and near the Seman river, could be reconverted in a biomass power plant and water treatment plant, bringing at the same time a responsive ecological and social improvement.

Although this scenario embodies only a hypothetical vision for local development processes, we think that it represents an interesting operative method of how we could 'design infrastructures as landscapes' uniting two separate entities such as the 'oil' and 'landscape'. In this sense we would like to imagine the transition from 'oil infrastructures' to 'oil meshes' with a new environmental and social dimension; taking in account the reasoning behind the name OILANDSCAPES.

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Fig12 / Polyvalent energetic production landscape in Seman Basin souce / PhD international workshop students

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4
berat competition

Research by design / exploring resilience

Berat competition call[1]

from the Manifesto "Call for expression of interest", Ministry of Urban Development and Tourism, AKPT – National Territorial Planning Agency and Atelier Albania.

Manifesto

The competition area is both a target and a test site at the same time. It is a small island in a relatively small historic city in Albania, the city center of which is part of the UNESCO World Heritage Sites. There is a lot to tell about the city, its particular history and its architecture, but since it is not the scope of the brief to fall into those details, these explanations will be part of a separate document. The island itself, which is the site of this international competition, is a leftover asset neglected by the city but which nevertheless changes shape time after time because of the changes in river water flows. The strong presence of this asset in the city landscape means that the island can be transformed in a real focal point for the city and particularly for the neighbourhoods at its vicinity. This island deserves design thoughts that will shape its potential. On the other hand, throughout history the island and the river water have continuously been in a struggle for defining their territories. Recently Albania experienced flooding and a lot of issues that come along with that. Even though flooding is not a new phenomenon it again caught residents of the flooded areas unprepared, and as a result there was a considerable inventory of consequences. This international contest is announced with the purpose of connecting the Osum Island to the city of Berat network. This international call is looking for ways where urban can cohabitate with nature and be resilient towards any natural phenomenon. Through this open call, Atelier Albania, aims to attract teams of architects and designers. The goal is to obtain the most original and visionary concepts of an architectural and urban character intervention for the test site Osum Island in Berat and come up with innovative solutions to develop the landscape, or be 'urban by nature' and be resilient at the same time. Concepts should be based on principles that are informed by and in return respond to the peculiarities of the context, requirements of the assignment but are also informed by the experiences of other countries.

Competition area

The area of competition is determined by the footprint of the Osum Island in Berat, which is changeable according to the water flows. The island is positioned in between the banks of the river and is faced by the two oldest and most beautiful neighbourhoods of Berat, which is a UNESCO heritage settlement. This island has a strong presence in the river landscape, but has always been neglected. During the early 40's of last century, the Italian architect and planner Gherardo Bosio, proposed in its plan for the city of Berat to connect both banks of the river through the island that emerges in the area where the river is much wider compared to other sections. This plan was not executed, at least for this part of the city. The connection of two riverbanks was realized south of the island, where the river narrows down, leaving the Osum island neglected, even though its presence has a very strong impact on its urban and natural landscape.

[1] *Call complete text available at http://competitions.planifikimi.gov.al/beratisland/ [last access 10.07.17]*

Fig1 / competition area
source / Call for expression of interest" Ministry of Urban Development, AKPT and Atelier Albania.

Dynamic Resilience / a symbiotic relationship between Nature and City

Competition report

MetroPOLIS, dsb landscape and 3TI LAB

***design team MetroPOLIS** / Besnik Aliaj, Loris Rossi, Endrit Marku, Elvan Dajko, Vera Bushati, Gezim Qendro, Laura Pedata (landscape design consultant)*
collaborators / Figali Dardha, Ilva Mishtaku, Fatos Elezi, Adelina Ibrahimi
***design team dsb landscape** / Dong Sub Bertin, Martina Pasolini*
collaborators / Sandra Matic, Lucia Mordaci, Erika Cormio, Prisco Ferrara (render), Nicola Canepa (agronomist)
***design team 3TI LAB** / Antonello Stella, Paolo Rossi, Carla Gerundino, Carlo Baglivo*

Spatial program

In terms of urban morphology the city of Berat presents itself as an aggregation of smaller nuclei which are a result of the progressive addition of neighborhoods and the different expansion patterns influenced by the succession of conquerors over history. Despite this complex history, the city presents a balanced coexistence between different ethnicities and religious groups.
The primary urban roads run along the two opposite banks of the river, but they also delimit the latter and, therefore, become an additional obstacle to the connection between the two sides of the city and the neighborhoods of Mangalem and Gorica. These roads seem like two independent arteries that only meet in two points – one is a pedestrian bridge and the other is also accessible to vehicles – this causes the river to appear as an independent element excluded from the life of the city. On the other hand, the secondary roads, rigid and linear with a roman layout, appear as ramifications that are projected beyond the city and into the farmland, the surrounding nature and the sinuous hills.

Vision / Strategic objectives

The mail goal of the project is to promote local development conditions through light and low-impact landscape and programmatic operations on the riverbanks and the islands, while preserving the specificity of the territory and guaranteeing the city's resilience to flooding in the years to come. All of the above can be achieved through the application of ecologically-sustainable development models.
In synthesis, the main objectives set by the project are the following:
-Strengthening the connections connecting the Osum Island to the city network, improving the connections between the riverbanks and the main areas of the city.
- Enriching the value of natural, cultural and environmental assets along the river with the aim of boosting and regenerating tourism throughout the year, offering both citizens and tourists new spaces for outdoor leisure and recreational activities.
- Protecting and improving the environment and preventing ecological degradation through preventive actions, management and reorganization of degraded and abandoned areas.
- Guaranteeing the resilience of the river and its islands.
- Favoring biodiversity and the presence of areas suitable for the growth of autochthonous plant and animal species.

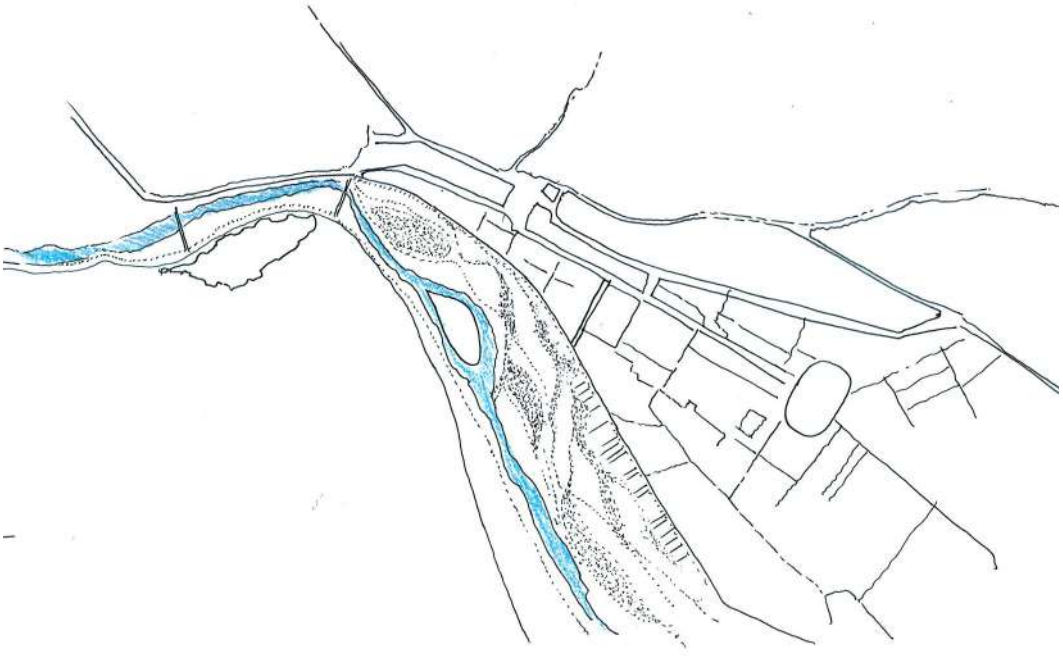


Fig1 / Spatial program sketches
source / competition report

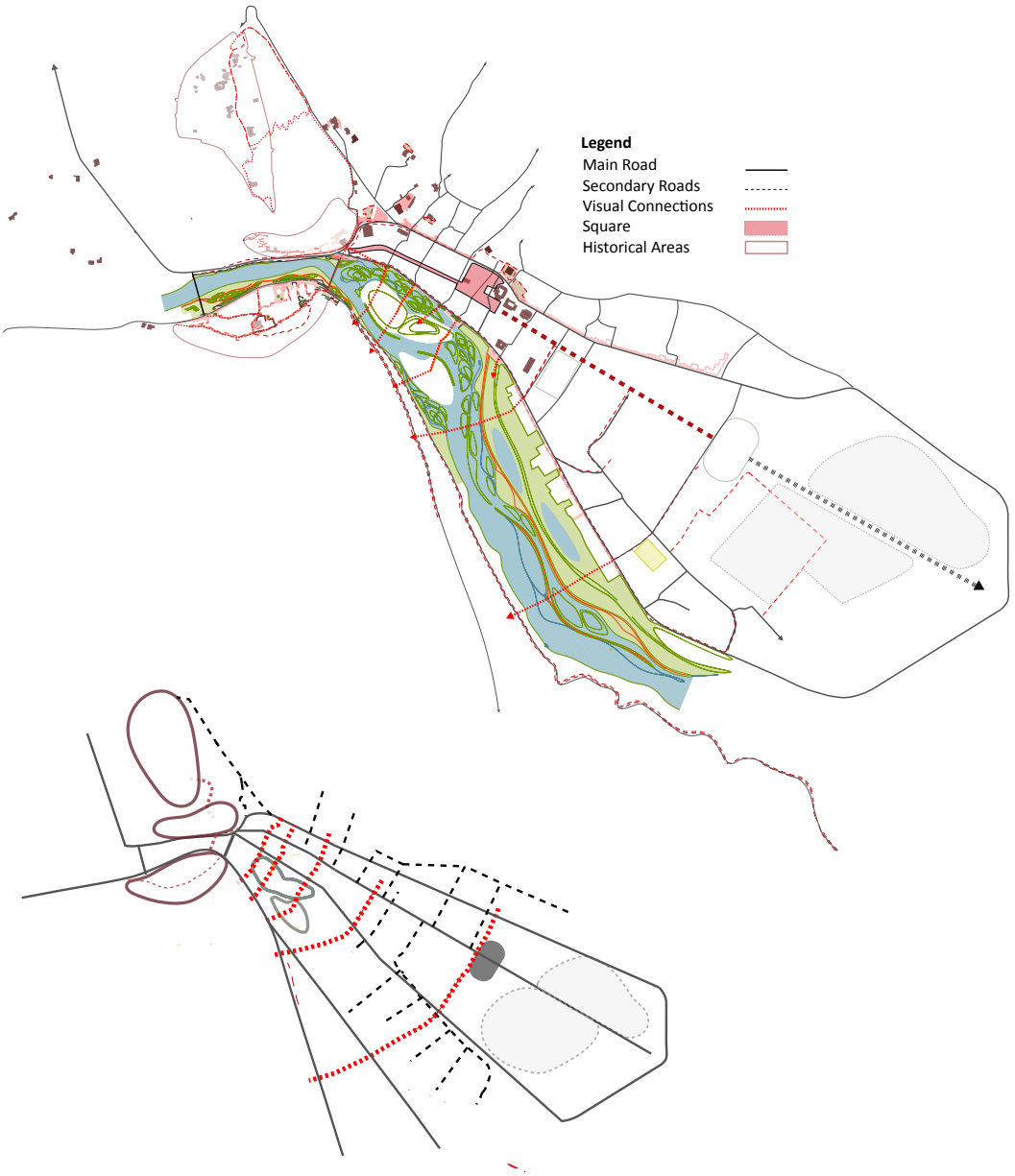
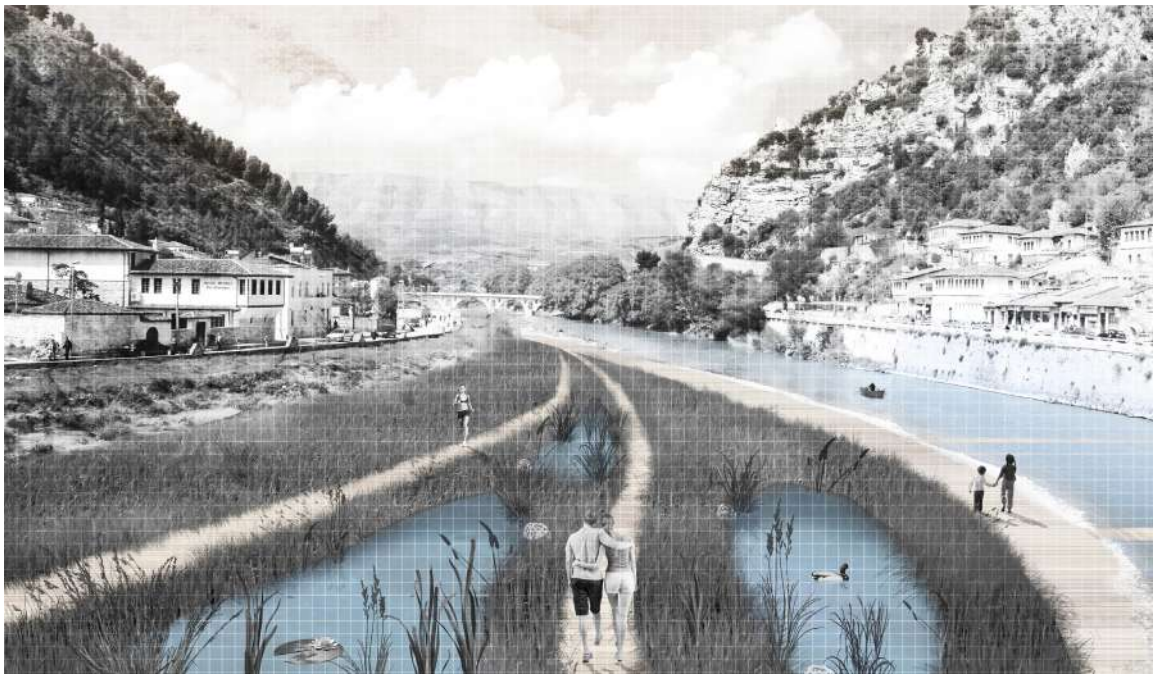


Fig2 / Strategy diagram
source / competition report



Vision / Strategies

- Securing the riverbanks with retaining rope gabion walls and riprap/rubble;
- Creating natural pools for water overflow storage;
- Protecting the main islands from erosion with reefballs;
- Improving physical and visual commotions through pedestrian paths, bridges and piers;
- Favoring the formation of small islands through placement of reefballs;
- Reintroducing and strengthening riparian vegetation and fauna (birds, insects, fish);
- Creating spaces for recreational and leisure activities along the paths and on the islands.

Landscape from above / the river as a system

"When I arrive in a city, I climb the highest steeple or tower to have a view of the whole before seeing the individual parts, and when I leave I do the same in order to fix my ideas." (Montesquieu, 1971)

In the western aesthetic culture of the 18th and 19th centuries, the *observation from an elevated point of view was mandatory if one wanted to evaluate the size or proportions of buildings and capture and combine the "presumed whole and the experienced detail"* (Mending, 2011) at once. But even today, when the image of the city does not match with its monuments any longer, the power of an unlimited overview is recasting the image of landscape from *green scenery beheld vertically to a flatbed infrastructure that includes both natural and urban environments* (Waldheim, 1999).

Any visit to Berat must include a climb up the ancient Kala settlement where the viewer's gaze can embrace the river in its entirety. From this privileged and detached position, we can truly discover and understand the river as a system.

1001 windows framing the landscape

Berat is known as the city of a 1000 windows with the windows of the Gorica and Mangalem neighborhoods looking at each other across the river as if they were mirrors; windows offer the possibility of selecting a portion of the territory and framing the landscape. A similar situation exists with the island and the surrounding context and vice versa, created through sculptural objects in the landscape and on the island that frame the context and project the view across the river and beyond, along the paths on and up to the top of the hills: the city can now be seen from new points of view and the existing views can be privileged and strengthened.

Linking islands with physical and visual connections

The city's urban polycentric morphology generated by the urban evolution through history and reinforced by the influence of the Ottoman urban structure, appears as a set of nuclear agglomerations on both sides of the river: Kala, Mangalem, Gorica, the expansion in the direction of the old bazar and the Murad Celesi suburb to the NW on the foothill, are like islands linked by bridges across the river. In order to create an integrated system of relations the project proposes to highlight the existing paths towards relevant buildings with cultural, social, artistic, religious and

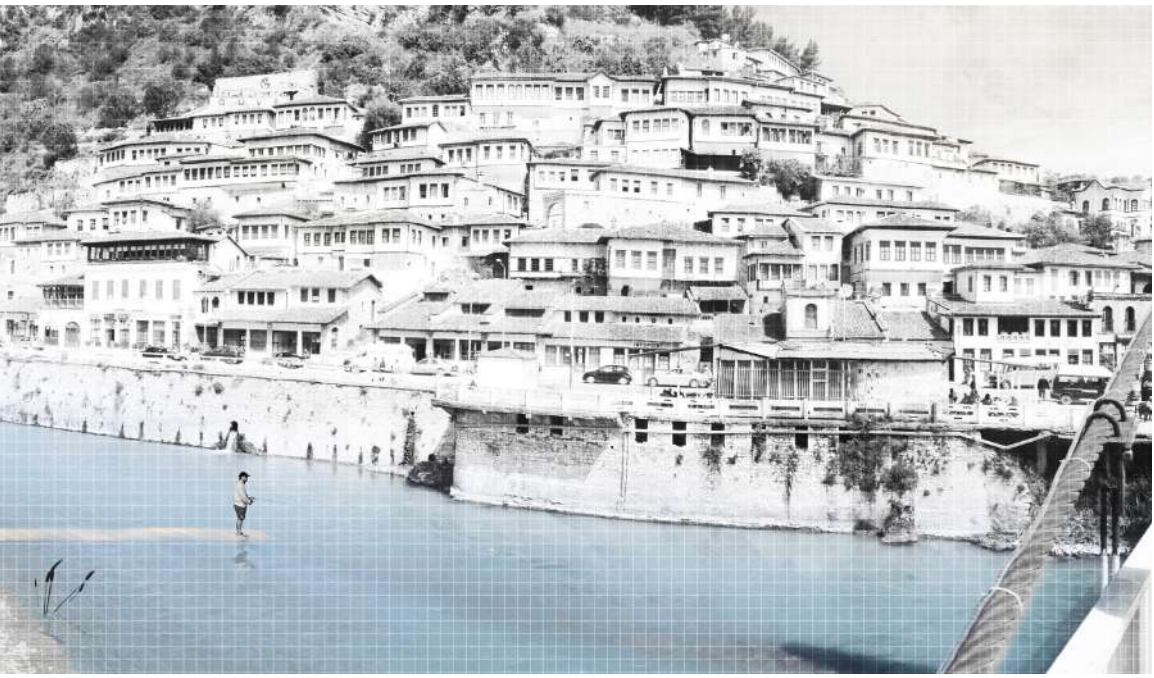
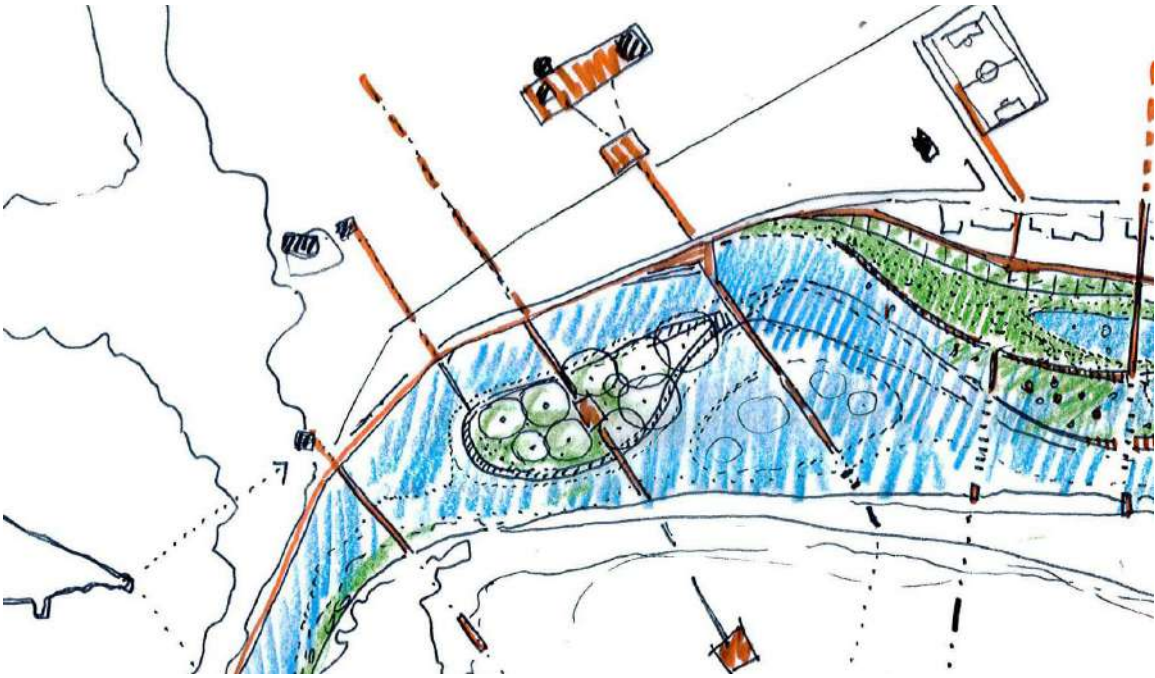


Fig3 / Project panoramic view of Mangalem area source / competition panels

historical symbols connecting them to the riverside and the islands through paths and touristic, cultural and environmental itineraries. This system will make the existing cultural values emerge and it will integrate them and the new leisure and recreational activities on the islands into a rich network of relations.
One of the project strategies foresees the inclusion of the island and the riverside paths in the pedestrian circulation system of the city. The paths along the river's waterfront will be regenerated and extended where needed to form a continuous promenade along the river; the latter will be crossed by pedestrian bridges that connect the north riverbank to the main islands. When the physical connections are impeded by the sea-level of the island and the partial or total sinking of the paths, the physical connection will be absent, but a visual connection will be established through panoramic cantilevered decks and land art sculptures that frame the landscape and project the view toward the surrounding territory.
The connecting linear elements which will be added across the river will be of three typologies, depending on the level of the islands and their proclivity to sink:
- Sinking paths / the ones that are located on lower levels and will be partially or totally submerged when the river's water level rises;
- Surface paths / paths that will remain on the surface and guarantee access and usage of the bridges even during medium water level conditions;
- Suspended paths / due to their resilience to flooding they will be the ones that can house outdoor activities and eventually boating docks.

Dynamic edges

Limits have a thickness, they are not lines, they have biological thicknesses and the latter are richer than the environments they separate. When different areas meet richness is generated. (Gilles Clement, 2005 – Manifesto del Terzo Paesaggio)
The project seeks ways where the urban can cohabit with nature while showing resilience towards any natural phenomenon. One of the strategies applied is extending the concept of the buffer area to the entire river system and transforming the riverside of the limit between city and river into a thick biological system that establishes a dynamic relationship with the water, balancing the shifting levels of water and, at the same time, offering recreation space and, most of all, an opportunity for biodiversity consolidation and preservation.
Therefore, the strategy adopted for the edges of the river is the creation of an artificial wetland and water overflow storage pools; the latter act as bladders that during periods of high tide store the overflow water and protect the waterfront from flooding while during periods characterized by low water levels become outdoor pools and complement the urban beach areas.
Moreover, in the far East area of the north river bank, this new dynamic limit will offer the possibility of dealing with the informal settlement along the river; in fact, the above mentioned strategy will regenerate the area (through paths and vegetation)



and strengthen the resilience of the river banks (through retaining rope gabion walls with integrated pedestrian path, overflow storage pols and vegetation), guiding the future development of the area.

Berat Island

Berat Island is not a static element in the landscape; its shape and vegetation cover changes following the season and the level of the water; each mutation generates a different scenario.
Similarly the landscape project and the new functions respond to this shifting condition, pandering the constant evolution of the island and managing, not guiding, its mutation in terms of vegetation and shape; but also offering suitable outdoor activities and services based on the accessibilities of the area in different seasons.
Ultimately the project elevates and underlines conceptually the main islands and suggests the formation of new smaller islands in the future through the introduction of reefballs along specific locations of the riverbed.

A refugee for biodiversity / birds and vegetation

There is little doubt that Berat's biodiversity is declining, but for most taxa trends are difficult to quantify due to lack of data. However, birds are better studied than any other group of organism, and thus are well placed to provide us with information on the overall health of our environment. Birds are a good bio-indicators because they occupy a high trophic level, occur in a wide range of ecosystems, their taxonomy and identification is well known, their territorial behavior (songs and displays) allow them to be censured readily during the breeding season, it is possible to collect large quantities of data in a highly efficient manner using skilled volunteers.
In order to use the birds as an indicator first we have to restore their habitat, therefore the project proposes native vegetation such as grasses, shrubs and small trees to be planted on the river's edge.

Functional aspects

Berat has 32,606 Inhabitants (2011 census results) and one of the project's main strategies aims at introducing new leisure and recreation activities along the river and on the islands to attract a higher number of tourists, increasing and diversifying the attractions, which will also contribute to the economic growth and regeneration of the surrounding districts.
The programmatic approach is centered on the establishment of a cultural waterfront development and eventually converting at a later stage one of the hotels along the riparian landscape into a visitor center. The river waterfront area and the island will be entirely walkable and cycle-friendly, guaranteeing a healthy and safe environment for all age groups.
A new way to live the riverside -tourist attractions, cultural and recreational activities for tourists and locals.
The design approach is to integrate engineering and art whilst being sympathetic to the local environment and preserving the landscape and the natural aspect of the islands. The plan is to merge the river and land by providing

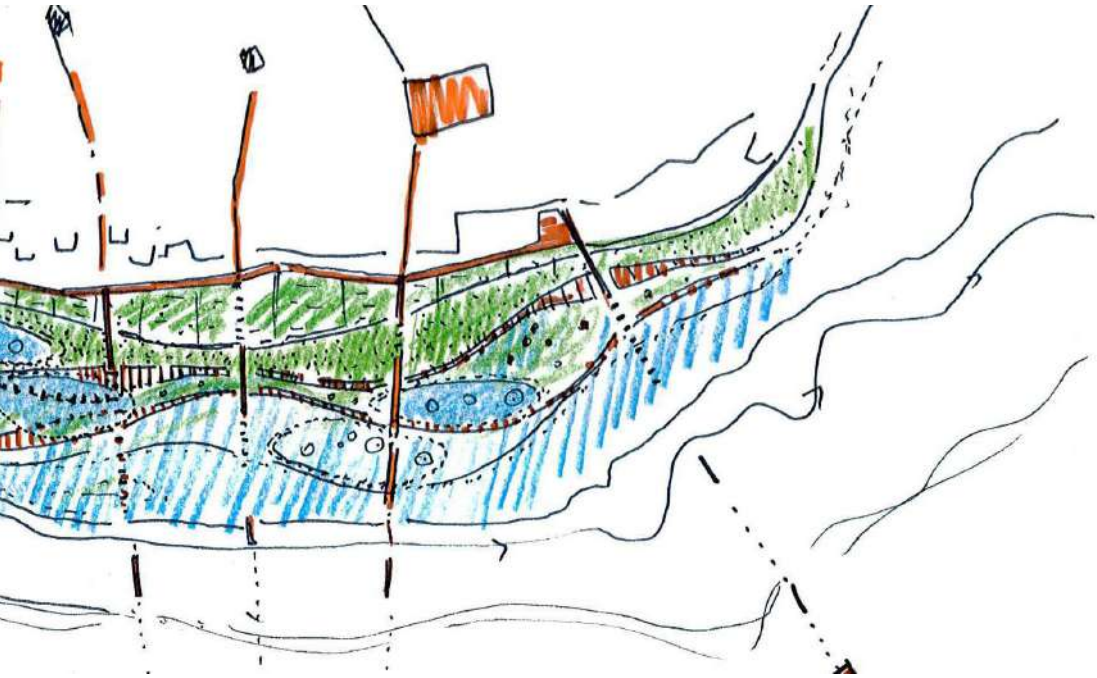


Fig4 / Linking islands, preparatory sketch source / competition report

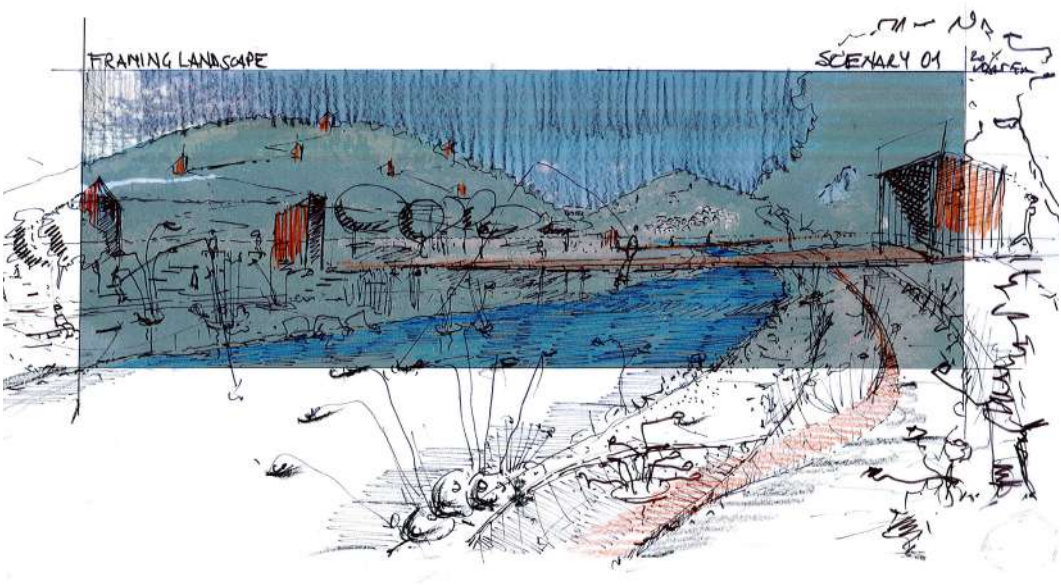


Fig5 / Framing the landscape, preparatory sketch source / competition report

light support facilities (small boating decks, small kiosks, barbecue areas, linear playgrounds for children on the suspended paths) for activities such as boating, fishing and nature walking, picnics and light sport and leisure activities. The abovementioned should complement the already existing sports and leisure activities which characterize the SE area of the city Centre. Thanks to the diversification of the activities and their extension to all seasons the river and the island will no longer be just for walking and contemplating the landscape during spring, but also for swimming and sun bathing in the summer (urban beaches), for bringing the children to the playground and for organizing outdoor educational activities all year.

Managing resilience / toolkit for the rise and fall of the river

The main strategy to address the issue of resilience to flooding is to refrain from trying to fix a predetermined shape and acknowledge that the very inconstancy/ fickleness of biological systems can become the guarantee of resilience to time. The approach is to manage the perpetual mutation of nature, to orient its variation, not guide the latter and predetermine or limit the natural and dynamic movement

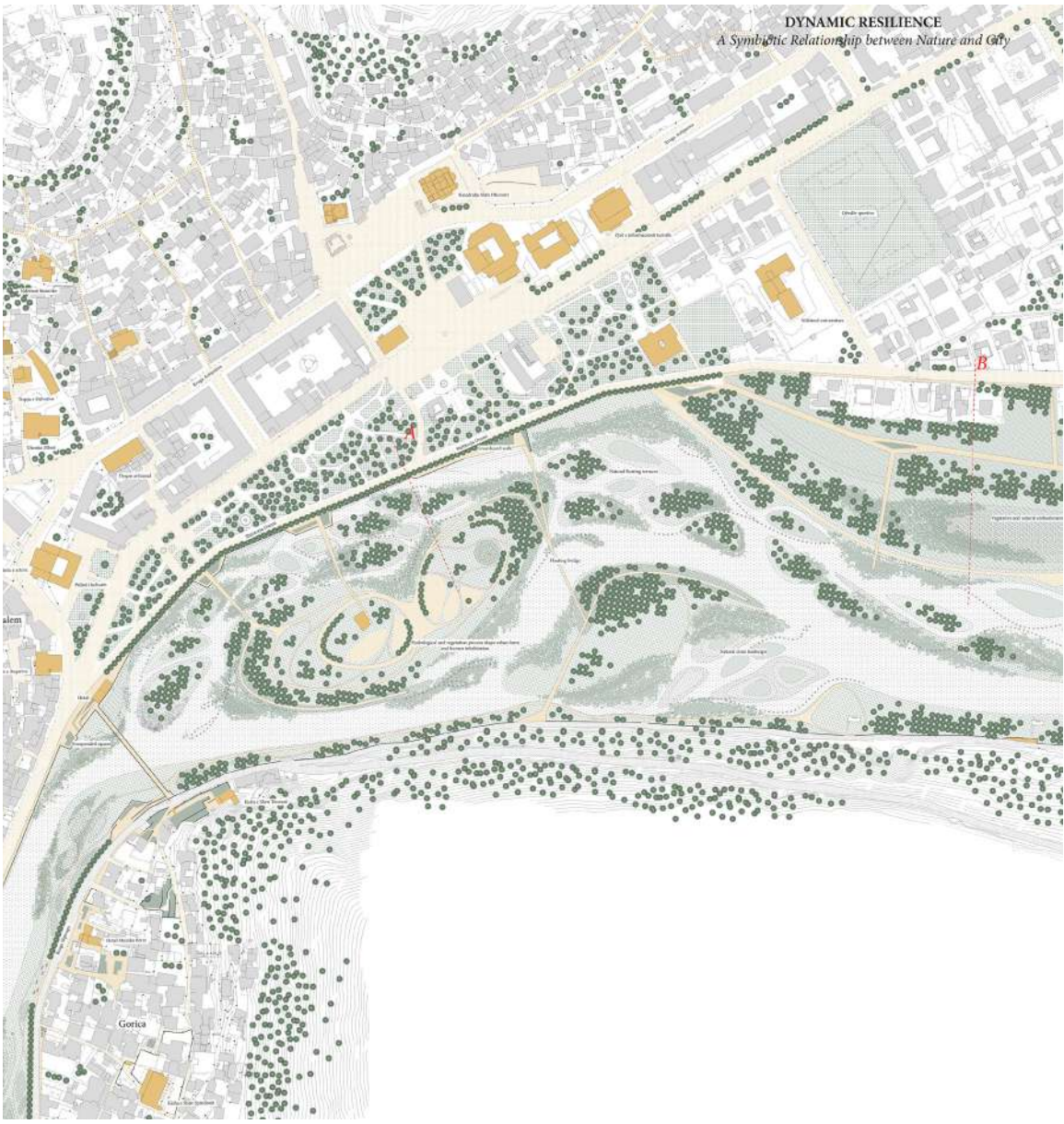
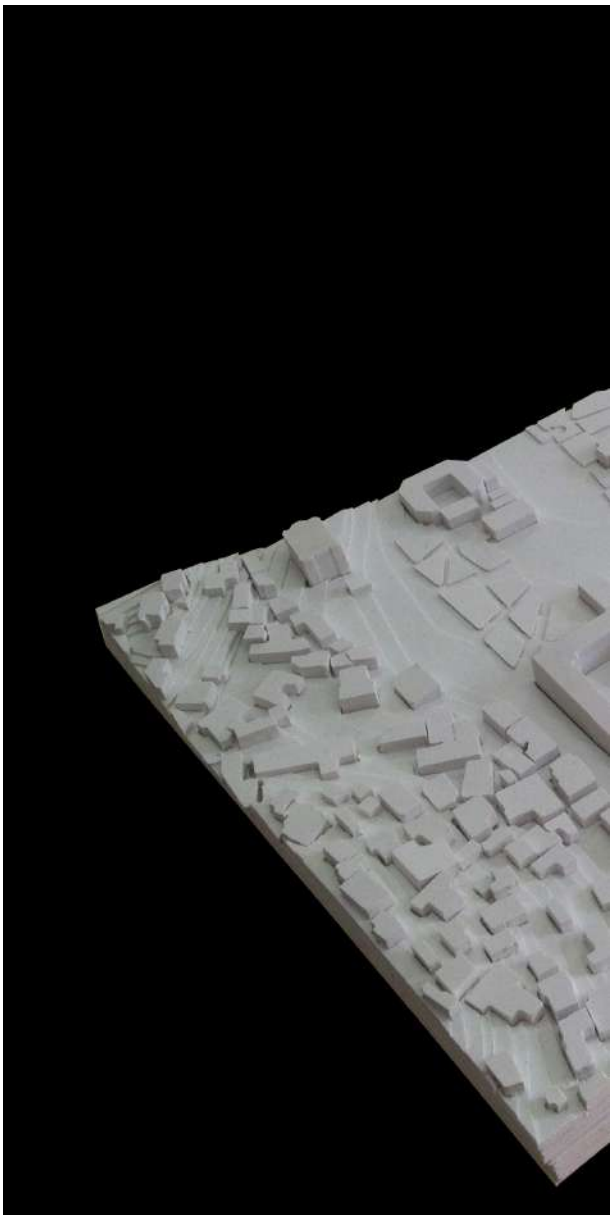

DYNAMIC RESILIENCE
A Symbiotic Relationship between Nature and City
A
B
Gorica

Fig6 / Masterplan
source / competition panels

and modification of nature.
This attitude was inspired by the concept of biological order and "Garden in motion" by Gilles Clement – in his first book: "The Garden in Motion" he talks about natural disorder (or biological order), which is still seen as something to be organized by architecture as it is not perceived as a general conception yet. By observing his own garden Gilles Clement formulates a new attitude towards gardening and landscape design, following the sequence: *Observe, Understand and Act using forces that are already present on the territory.*
In practical terms the strategy to make Berat city and Osum Island become resilient to flooding situations and anticipate water inundation is to propose a 'toolkit of resilience' that can be implemented in different phases and applied to similar riverside or seaside conditions around Albania. The approach divided in stages and potential conditions of improvement makes it suitable and applicable in other territories of similar conditions and open to similar climate change risks.

Conclusion

Landscape is an open system, it is a Medium uniquely capable of responding to temporal change, transformation, adaptation, and succession. These qualities recommend landscape as a medium uniquely suited to the open-endedness, indeterminacy, and change demanded by contemporary urban conditions. As Stan Allen puts it:
"landscape is not only a formal model for urbanism today, but perhaps more importantly, a model for process."



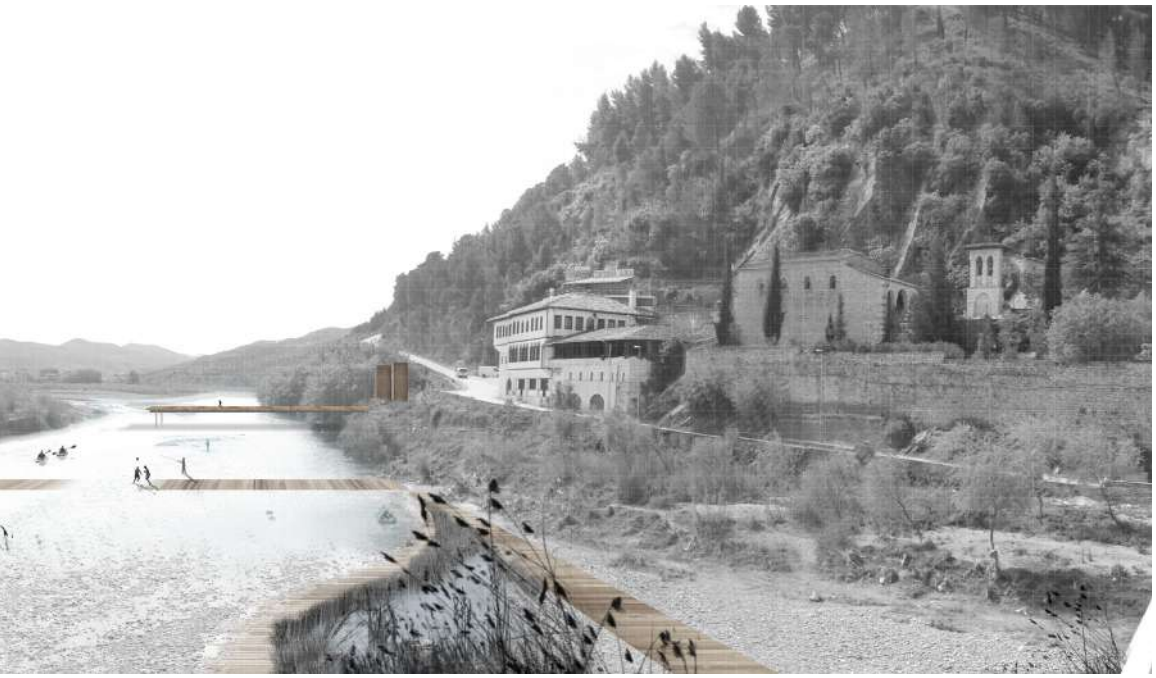


Fig7 / Project river view
source / competition panels

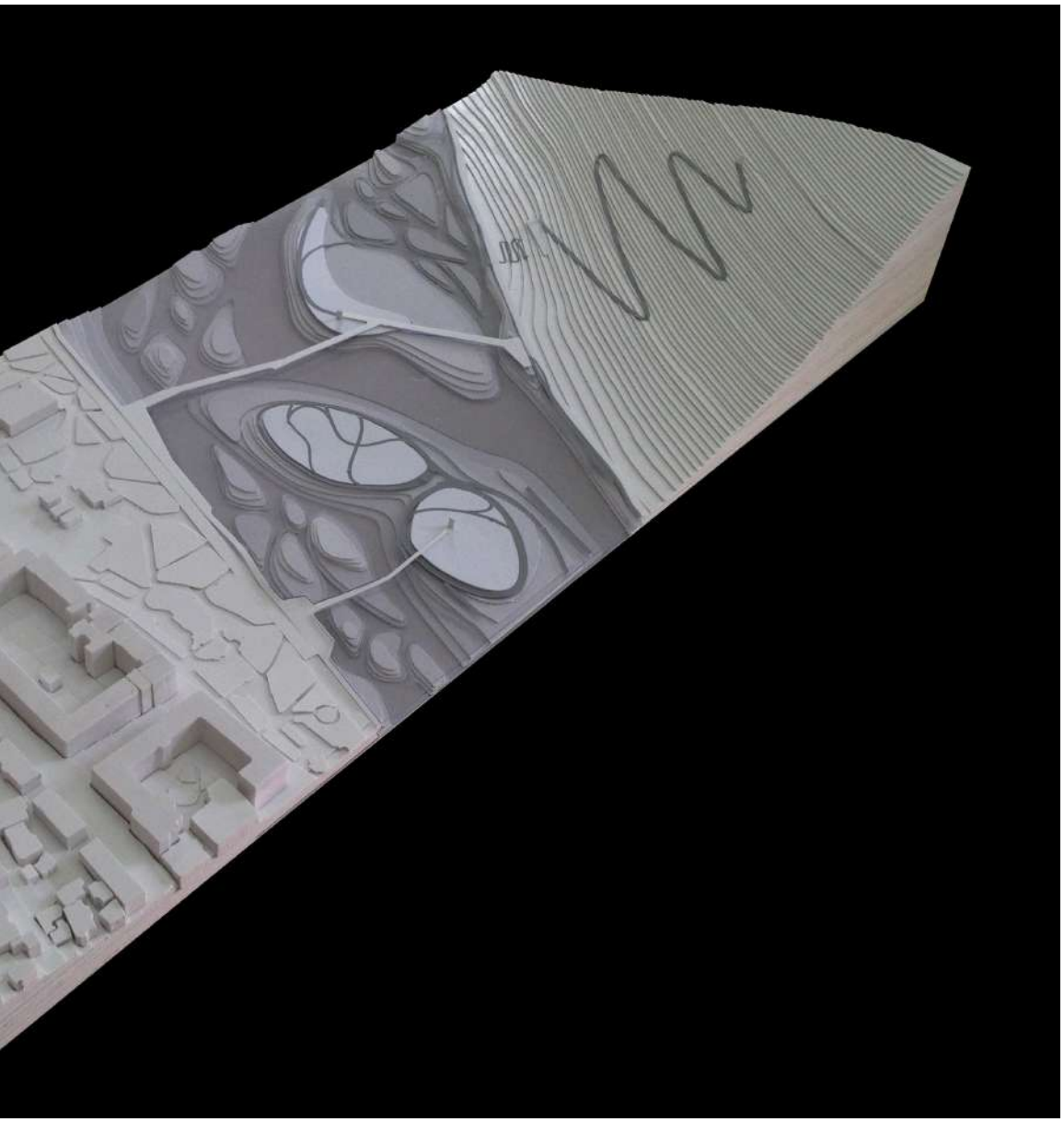
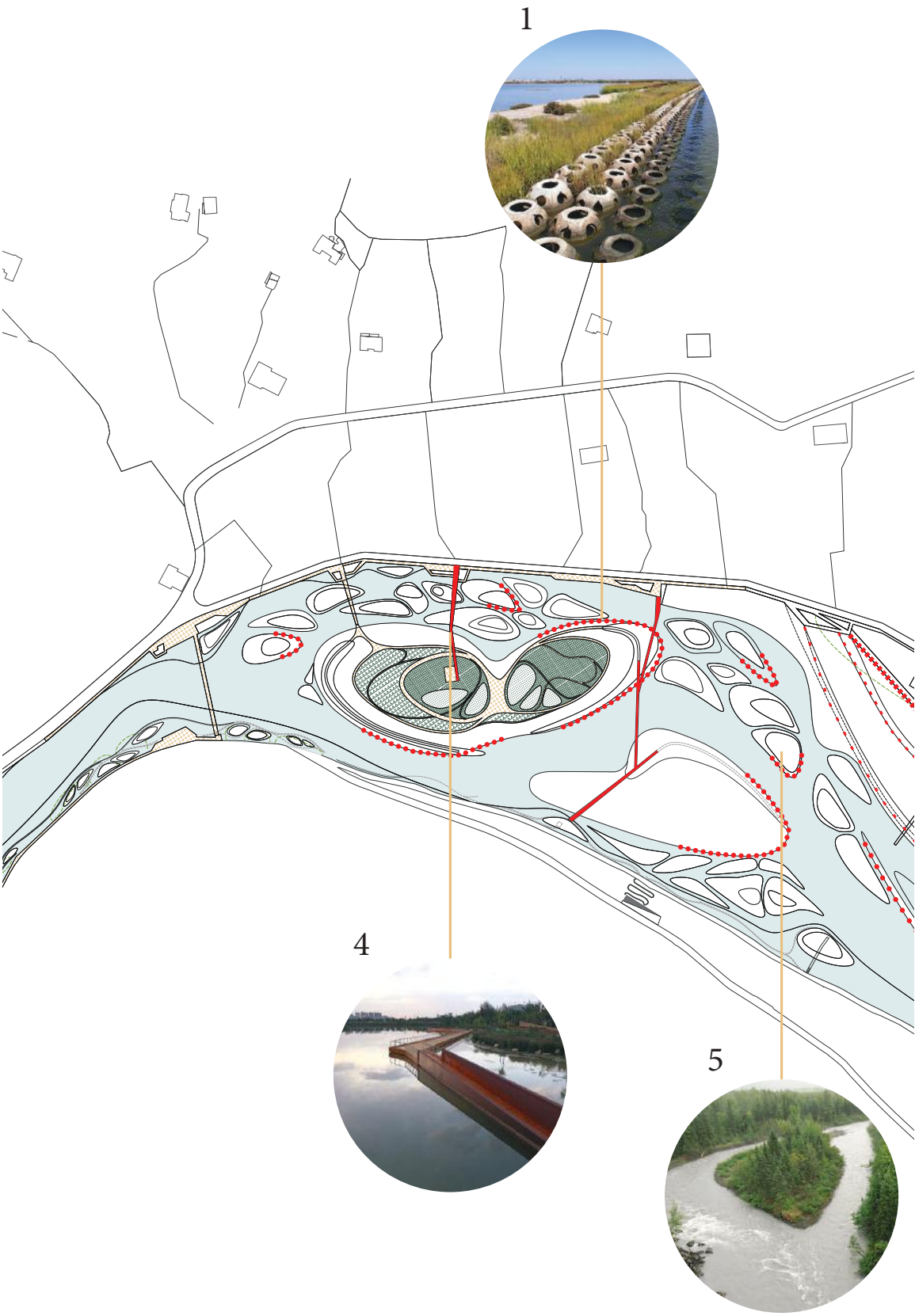


Fig8 / Berat competition model
source / tred studio, Tirana



1. Reefballs for island and riverbank protection and creation/strengthening of riparian vegetation.
2. Sloping edge with riprap/rubble.
3. Stepped edge with retaining rope gabion walls with integrated pedestrian path.
4. Suspended pedestrian bridges to guarantee connection between opposing river banks and the island and the city.
5. Small islands for slowing and managing river water flow.
6. Natural pools for water overflow storage.

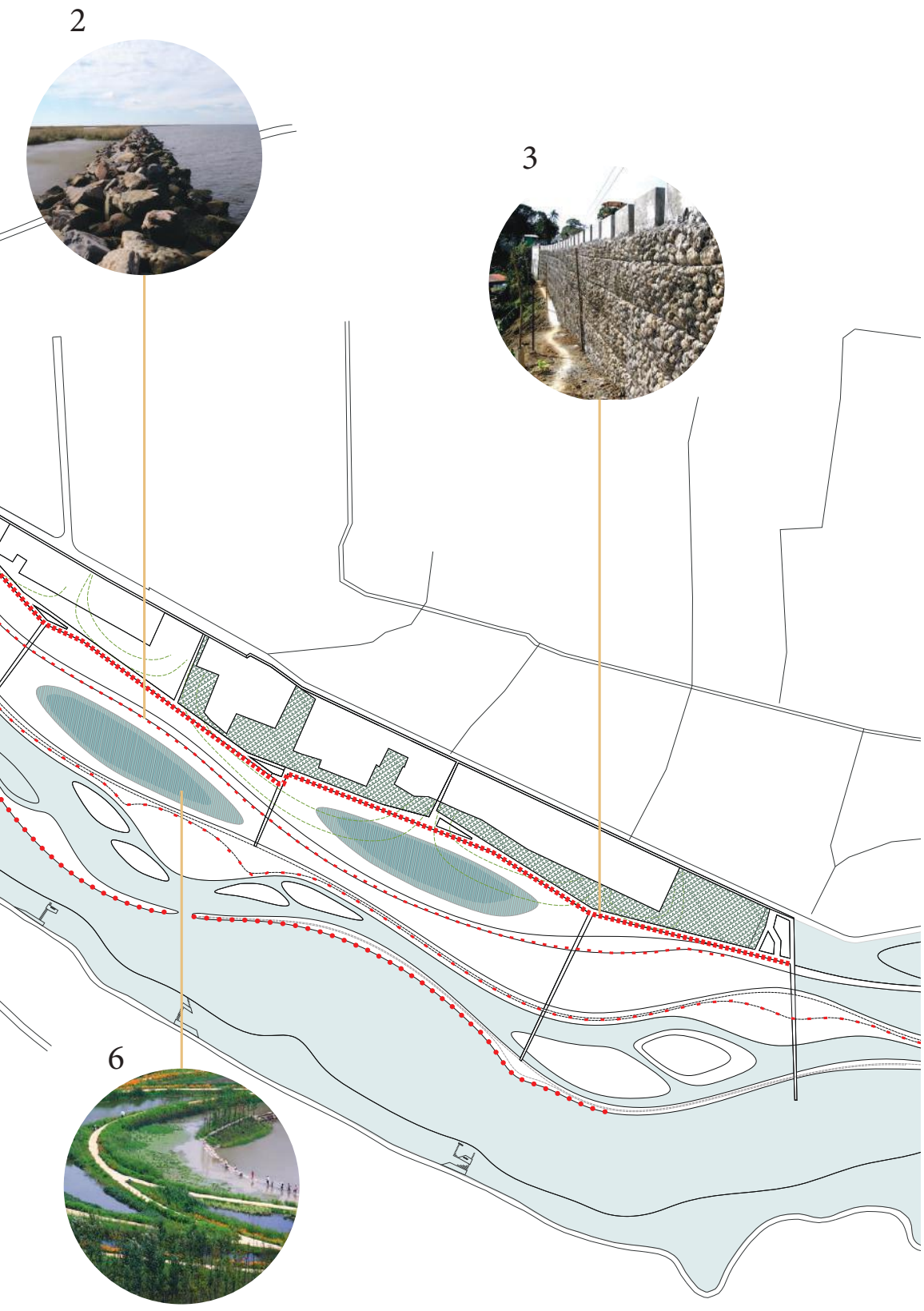
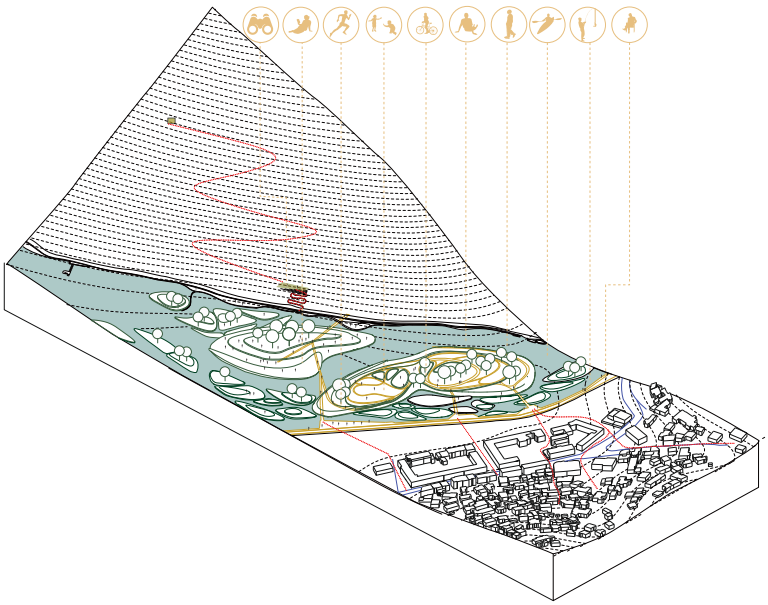
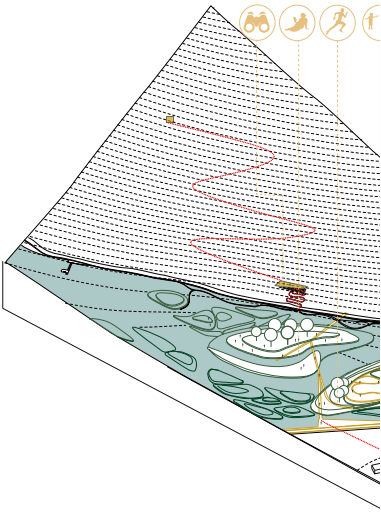


Fig9 / Toolkit localization
source / competition report





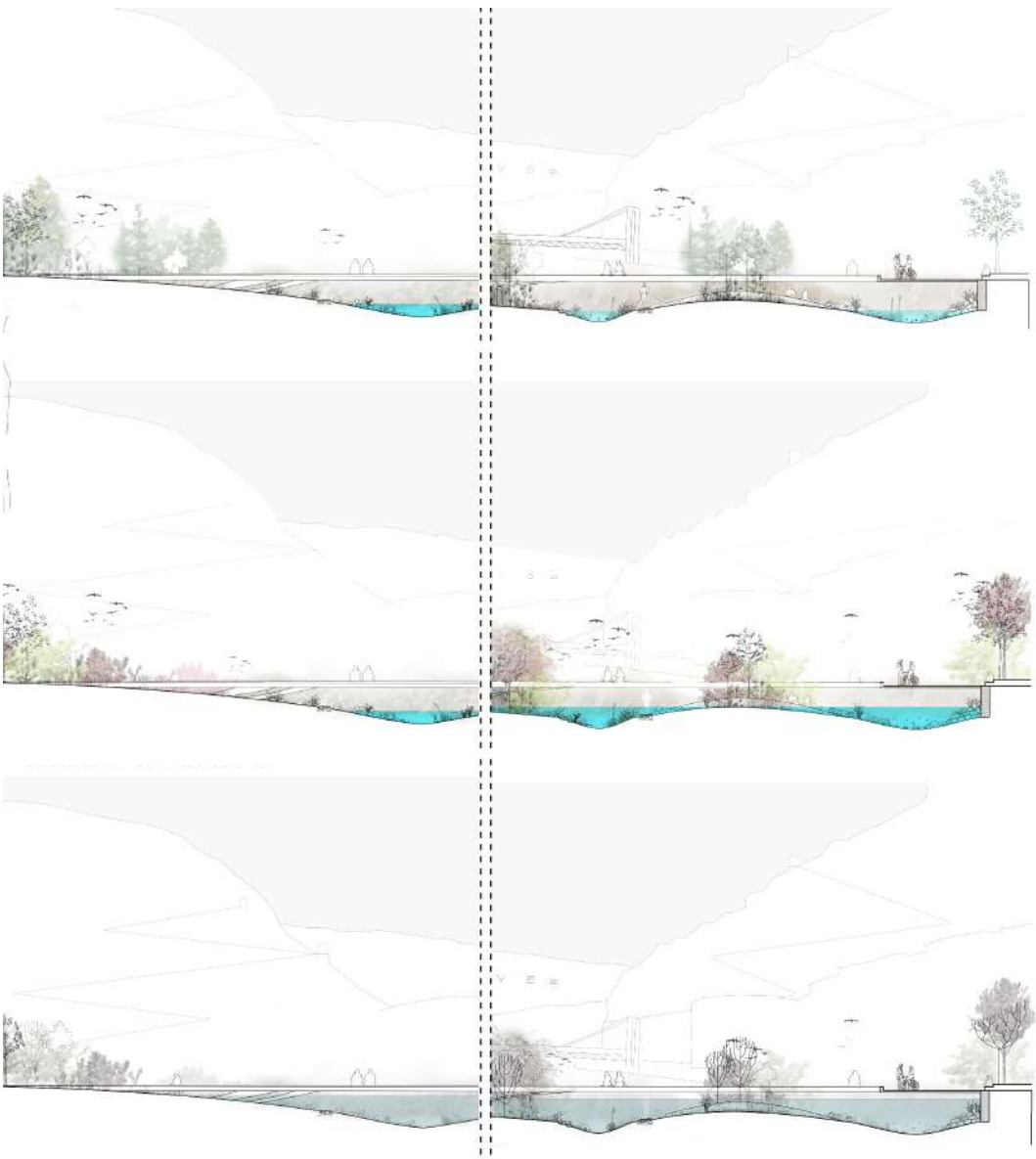


Fig10b / The rise and fall of river – sections in A area
source / competition panels

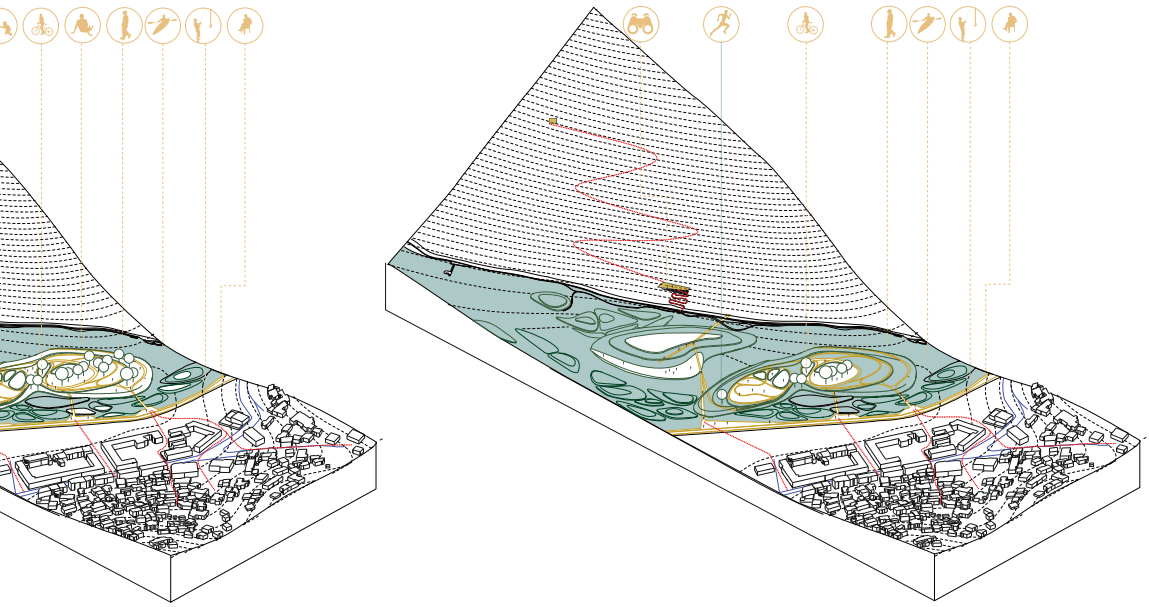


Fig10a / The rise and fall of river – scenarios in A area
source / competition panels

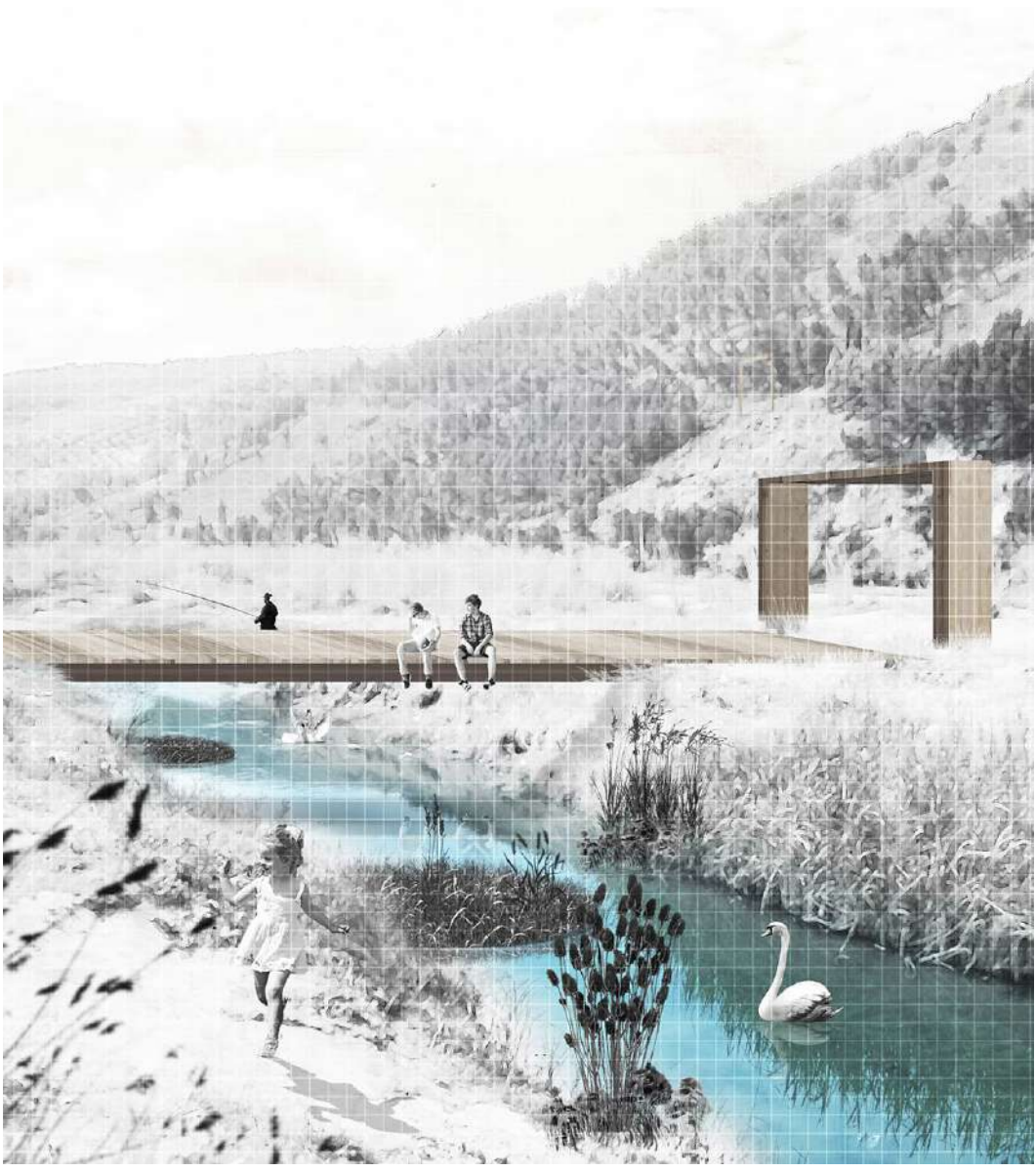
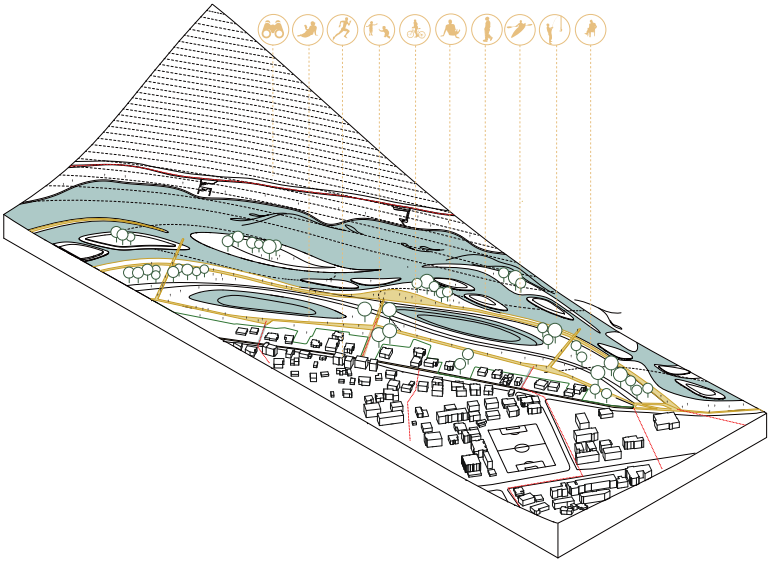
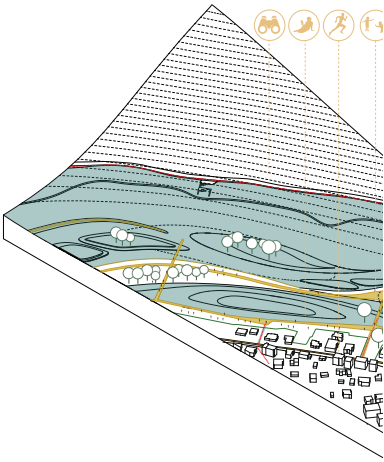
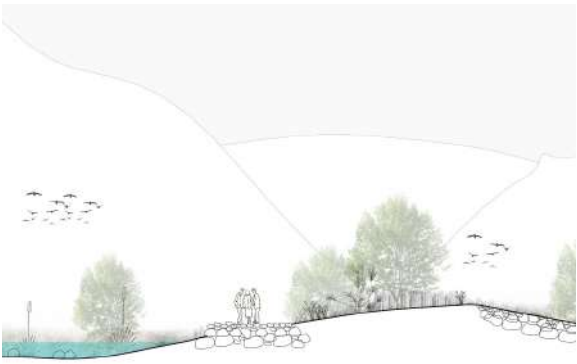
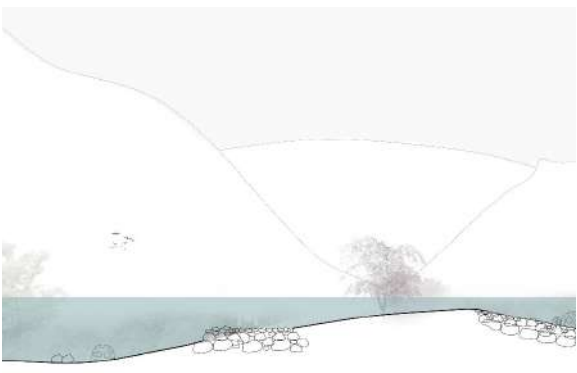


Fig10c / The rise and fall of river – view
source / competition panels









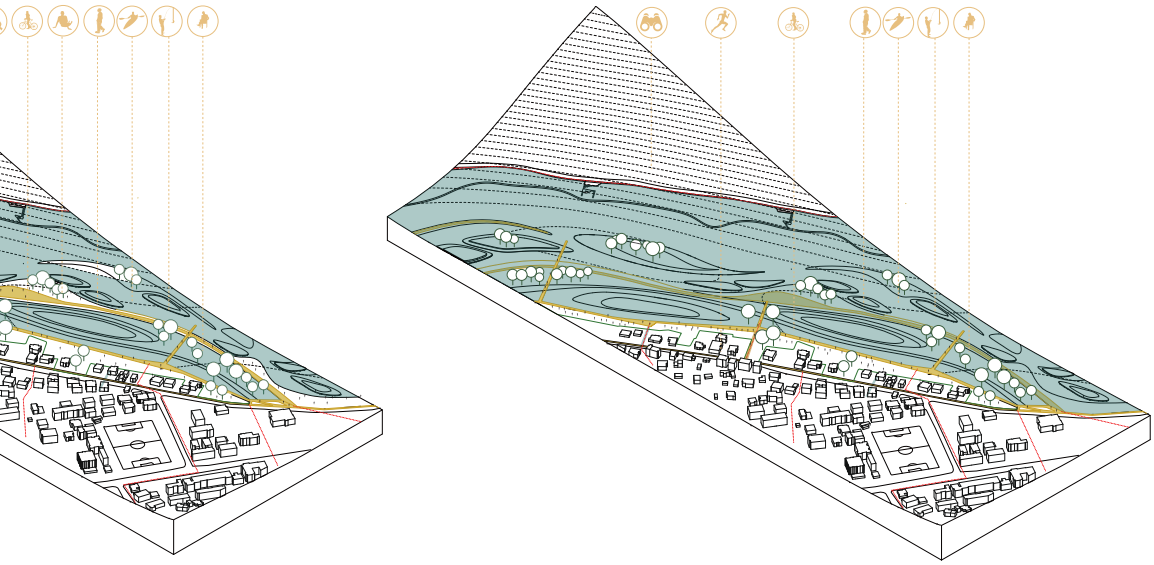


Fig11a / The rise and fall of river – sections in B area
source / competition panels

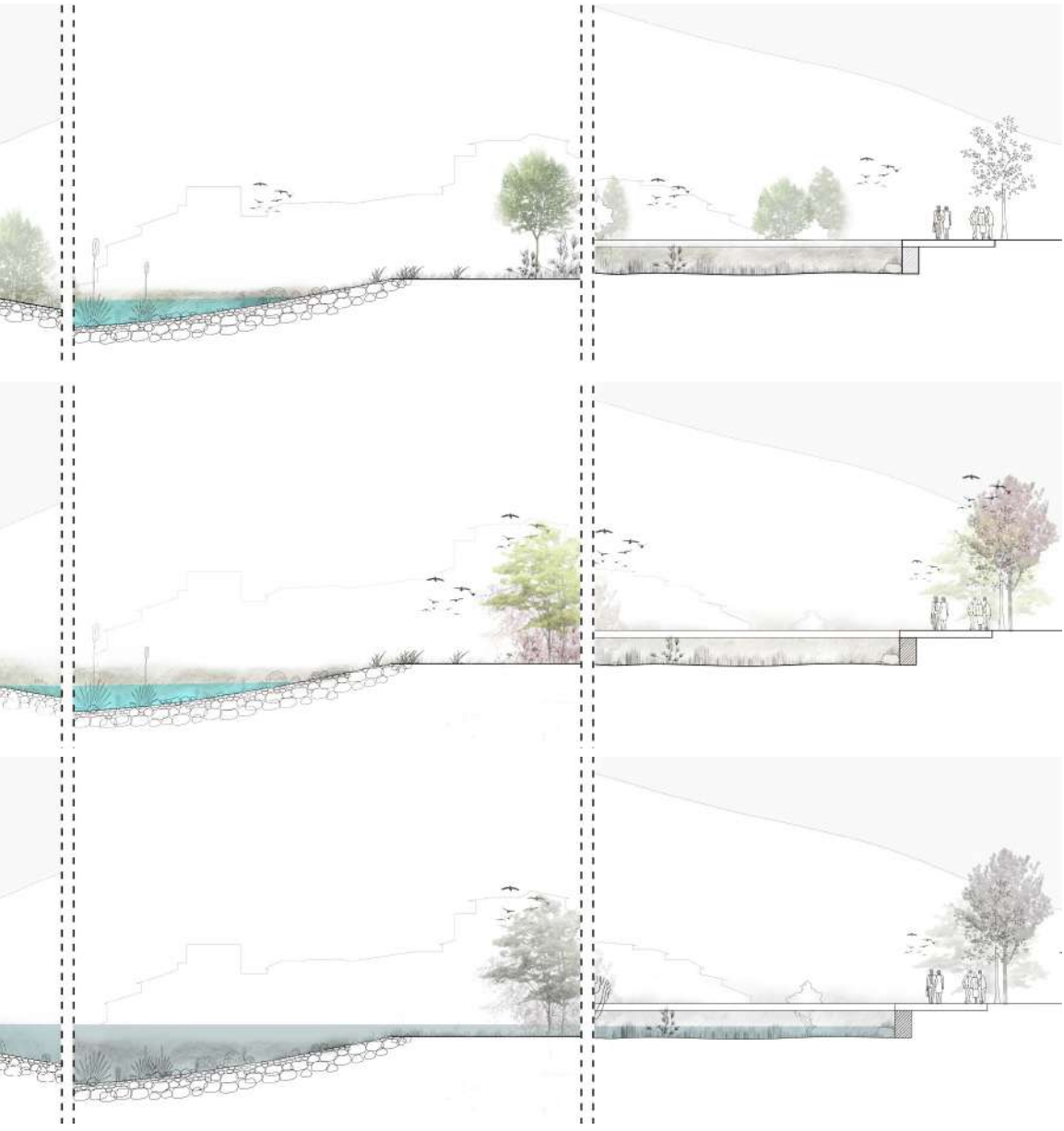


Fig11b / The rise and fall of river – sections in B area
source / competition panels

Fig12 / View of the project source / competition panels

Seasonal isles / a drought & flood resilient future for Berat

Felixx, UNESCO / Institute for Water Education and Polis University
Secon Prize winner

***design team Felixx** / Michiel Van Driessche, Deborah Lambert, Marnix Vink, Willemijn van Manen, Fabrice Wack, Carlijn Klomp*
***design team UNESCO-IHE** / Willem Veerbeek*
***design team Polis** / Antonino di Raimo, Ledian Bregasi, Sotir Dhamo, Thoma Tomai*
collaborators / Dea Buza, Renis Batalli

Design concept / introduction

The Berat Island competition centers on a group of temporal islands (i.e. sandbanks; sediment deposits) in the Osum River that left bare during summer when the river's baseflow is limited. During the driest periods, only a small stream is flowing through Berat, leaving most of the riverbed exposed. Apart from a bottleneck West of the city, the river sections around Berat are relatively wide. This leaves the city with an unused wasteland, covered by temporal vegetation. Due to the flood hazard during winter, the islands are left relatively untouched. This paradox needs to be resolved, without significantly interfering with the current river regime.
This proposal attempts to overcome this paradox by introducing a development strategy for the islands that is both drought and flood resilient, but most importantly connects the dry riverbed with the city. The proposed solution might not only be feasible for Berat, but might also provide a generic strategy for many of the other cities in Albania facing similar problems.

Resiliency / From fashion to guiding principle to cope with an uncertain future

'Resiliency' has replaced 'sustainability' as the next buzzword for many projects. Yet, the concept of resiliency has a solid body of scientific work in ecology and engineering (e.g. Holling, 1973; Hollnagel et al, 2007). The basic notion of resiliency is how a system copes and recovers when it is experiencing conditions beyond its initial design criteria. This makes it especially fit for conditions that are clouded by future uncertainties: instead of being optimized to operate within a predetermined range of conditions, the system is designed to cope with a relatively wide range of different conditions. This can be achieved by making the system robust (i.e. making it able to withstand extreme conditions), or by making the system flexible (i.e. ensuring that it can be adapted in the future to cope with changing conditions).

Main challenges / Developing a robust river for all seasons

The seasonal variability in discharge of the Osum River is large: during summer the river's baseflow barely sustains a small stream while in spring the steep river basin can cause peak discharge levels that almost mimic those of flash floods. Thus, coping with such extremes requires a design that can accommodate periods of drought as well as abundance of water while ensuring value and use to the city of Berat. These observations change the focus of the task, where the issue is not only how to make Berat's islands and river bank more resilient to high river discharge levels and subsequent floods, but maybe even more importantly, how to maintain the river during summer and early autumn when water levels barely sustain

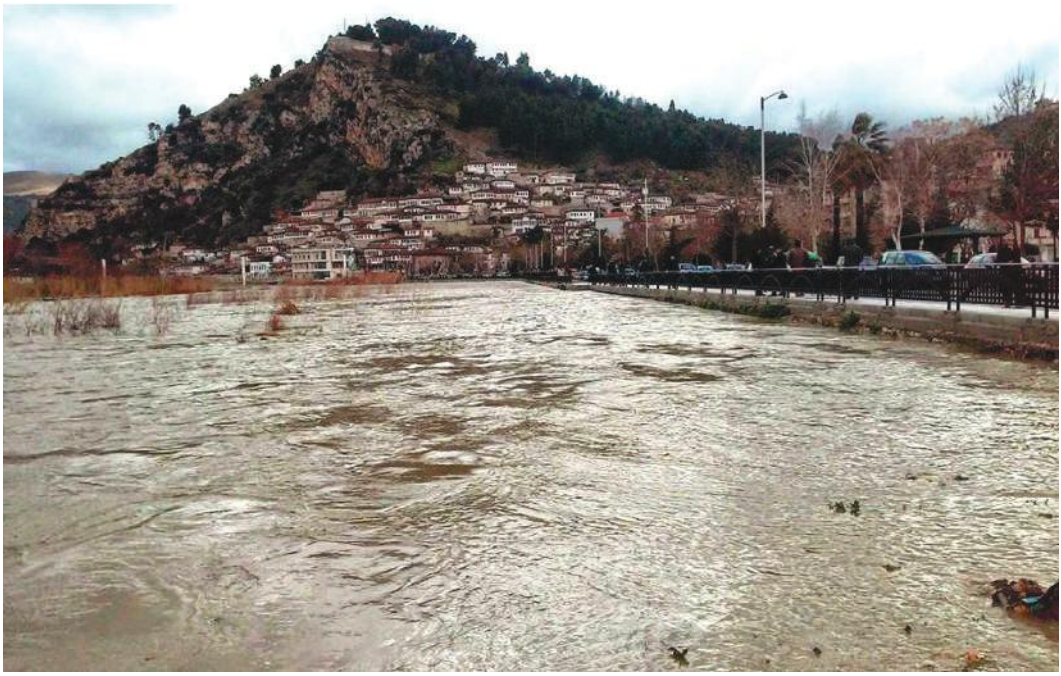


Fig1a / High water in Osum River in Berat source / competition report

Fig1b / Low water in Osum River in Berat source / competition report

a stream and the riverbed is dominated by sandbanks covered with low quality vegetation and deposited litter.
The seasonal variability in river discharge creates also another characteristic feature of the islands: the islands' morphology is continually changing. Compared to for instance many of the large river basins in the rest of Europe, the Osum river is relatively steep which causes high flow velocities. This results in high erosion levels and (partly due to the soil composition) a large sediment load during winter and spring. The erratic hydrodynamic behavior of the Osum River causes the sandbanks in the broad sections of the river to continually shift. While these dynamics might be regarded as a characteristic feature of the Berat river, they also limit or even prevent actual use of the islands and hence their role as an active component of Berat city.
The hydrology of the Osum River defines to a large extent Berat's problematic position: Located on elevated and steep river banks the city is well prepared to cope with high water levels; flood hazard is limited to adjacent villages and towns located within the floodplains. Yet, during periods of low flow, the city is unable to profit from the river. The marginal streamflow, the emerging sandbanks and the resulting amphibious river landscape only create an underused, low quality environment that does serve the characteristic of this UNESCO-protected city. The outcome is therefore to develop Berat's river islands as resilient systems able to cope with the hydrologic conditions associated to all seasons; to make the Berat islands both flood resilient and drought resilient; to be able to cope and recover from extremes but most of all to develop an active use of the river. Develop a proposal in which Berat profits from the Osum river during all seasons: during the high waters in winter but also during the dry periods in summer.

Operational resilience / building by nature, preparing for

Making interventions in the river bed does not necessarily imply the introduction of large scale structural measures; e.g. the introduction of quays, dams or other barriers that while ensuring a controlled steady flow during dry periods, create inflexible obstacles that limit the Osum River's discharge capacity during peaks in the wet seasons. Instead, it is possible to create a better 'guidance' of the river's hydrology by combining small interventions with the potential building capacity provided by the river's hydrodynamic: a controlled erosion and deposition of river sediment to create a relatively stable development of sandbanks and channels. Thus, by using the river flow and the resulting flood patterns due to the introduction of small obstacles (e.g. boulders, poles, etc.), we can shape the the landscape which during dry periods will constitute the sandbanks or 'islands'. 'Building with Nature'. Such an approach is not new: in various projects the hydrodynamic properties of water systems are used to change the morphology or flow patterns. For instance in the so-called Sand Engine project, beach and dune nourishment is achieved by using the tidal flows along the coast south of The Hague, Netherlands. The sand of a man-made peninsula, is distributed along the coast to maintain the beaches and dunes that protect the country against storm surges. In a similar fashion, boulders are used in many rivers surrounding Bergen, Norway to adjust the stream flows without the need for large, civil engineering-based structural interventions.

Currently, enough scientific knowledge in the field of fluvial geomorphology has been developed to create computer and/or physical models that mimics the effects of small interventions (e.g. deflectors) in streams and rivers (e.g. Knighton, 1996). Depending on an initial classification (e.g. Rosgen, 1994) and the collection of adequate data describing the hydrological features of the river in combination with the river geology (including an analysis of the sediment), a precise model can be constructed to determine which places are likely for sediment deposition based on the location, shape and size of non-movable elements in the river bed. Likewise the resulting channel(s) that are sustained by higher flow velocities can be determined and located to where they provide the highest value to the city of Berat in terms of usability. Additionally, depending on the sediment size, small ridges can be constructed resulting in alternating riffles and pools of deeper water to ensure a minimal water level in the river section adjacent to Berat. Especially in smaller streams, boulders (i.e. rocks) or tree trunks are often used to influence flow patterns and the stream morphology. For larger, more engineered solutions the use of gabion baskets is often preferred. These are relatively cheap, flexible and have been extensively tested by reinforcing embankments in order to limit erosion as well as deflectors for the alteration of flow patterns.

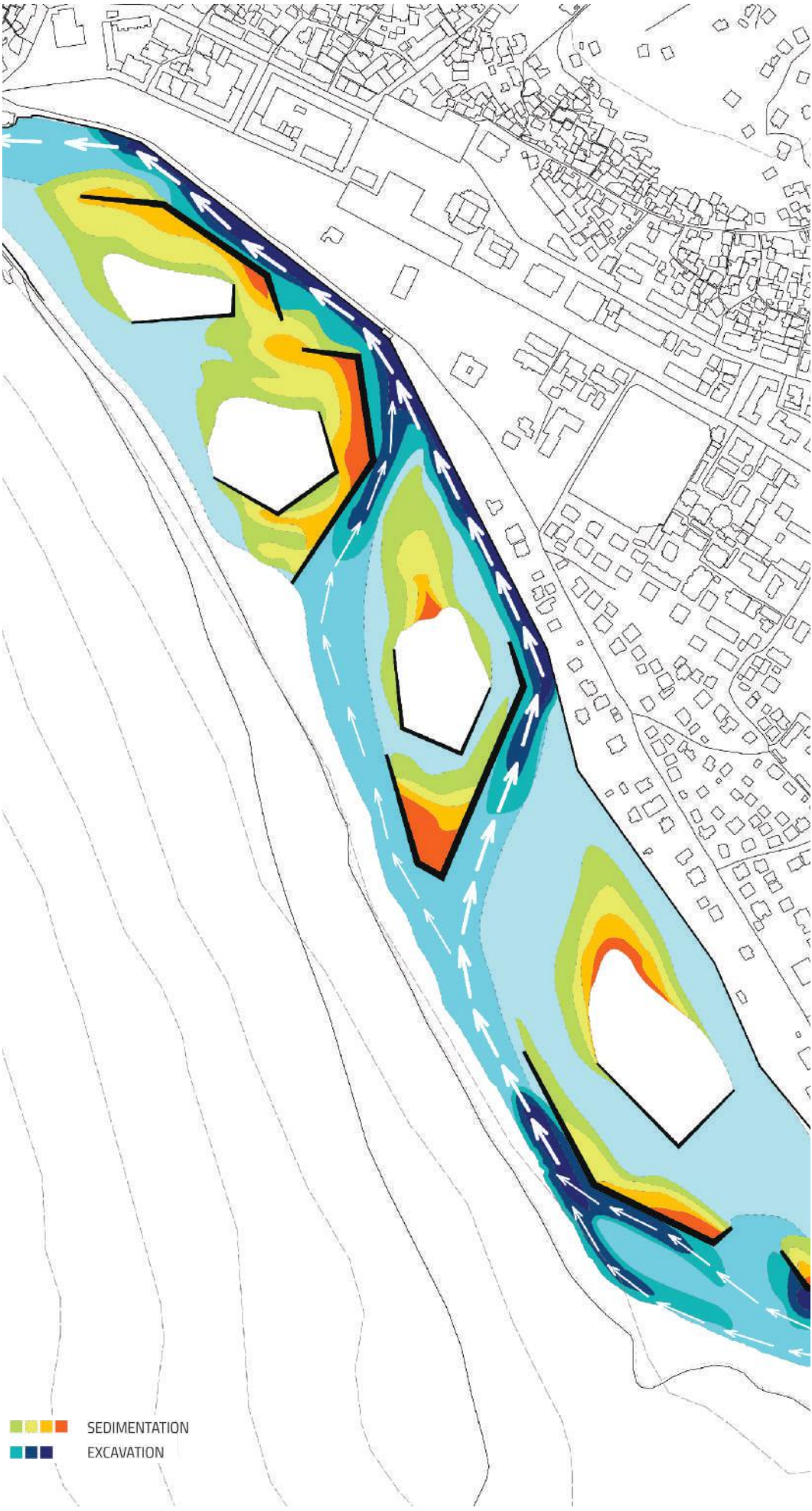


Fig2/ Position of structures in relation to streams of the water: sedimentation and excavation source / competition panels

Design strategies / controlled dynamics

Manipulating the river flow patterns by a 'building with nature'-approach provides the tools to develop a design strategy that is not only resilient to both droughts and floods, but also enhances the usability of the islands by providing a more robust basis for use. The design consists of 4 main pillars:

1. Give Berat a river / Ensure a minimal, steady streamflow during dry periods along a steady trajectory (i.e. channel). The river is guided by a first system of low curbs.
2. Develop the berat islands / By partially protecting the crests of the existing sandbanks, the contours of the islands are to a certain extent stabilized. The islands therefore become more robust and better equipped for vegetation and hosting activities. The river is guided by a second system of higher curbs.
3. Use the seasons to shape the land / By carefully adjusting to the different water levels associated to the seasonal variability in river discharge, a design can be developed in which the islands shrink and grow, reaching a minimal footprint during winter and early spring when water levels are highest, and a maximal extent during summer when only a steady streamflow is reached.
4. Integrate early warning into Berat / Extreme peak flows during winter and early spring could provide a possible flood hazard for Berat. Climate change will only exacerbate those extremes in the coming decades. It is therefore essential to not only develop an early warning system for floods, but also to manifest the warning in the city of Berat to ensure awareness among Berat's citizens and to restore the relation to the river by creating visible signposts. The bridge, used to make the islands accessible, could be opened when flash floods are coming. As such the opened bridge prevents the accessibility of the islands, and functions as a striking mark to warn the inhabitants of Berat for the high water.

These main focus points provide the basic framework from which the design is developed. Instead of focussing on objects or functions, the proposal is approached from the different seasons and the associated river characteristics.

Low water isles / summer & autumn

During the summer, Berat becomes alive. The city is vibrant and tourism flourishes which means that the riverfront should add to the city's scenery.
By introducing a low curb into the riverbed, the modest base flow is directed into a single stream predominantly adjacent to the Northern quay. The curb is widened to create a walking path along the canal; a second quay that provides a new routing through and along the 'summer version' of the Osum River. The new quay is connected to the city by a new bridge. Apart from providing a pedestrian walkway along the river, the curb-quays act as the perimeter of the largest set of islands: the first terrace level that becomes available when the sandbanks dry out during summer. Although providing the largest area, these flower gardens exist only for a few months annually; on average from mid July until late September.

That requires a vegetation that can flourish within only a few months but can be sustained when (partially) submerged when the water level raises (see Winter and Spring). This flower plane is criss-crossed with mown trails. The 'tail' of the islands, which unlike the 'head' is not protected by a curb, is dynamic and moves depending on the seasonal deposition of sediments during winter and spring.

A second higher curb system, providing the perimeter for a second terrace layer, covers a set of smaller islands when streamflows are somewhat more substantial. Due to this protecting curb, this terrace level emerges during a longer period, which means that the vegetation options are wider. Grasslands with bushes and trees create a parklike environment that adds to the public realm of Berat. It offers a place for residents to stay, and festivities to be organised.
The curbs are covered with wooden boardwalks. The low and higher curbs are connected with these boardwalk through the first terrace level, preserving a smooth connection through the entire islands in every season.

Low to high water isles / winter & spring

During winter and spring the discharge levels of the Osum River increase. The lowest curb level (and terrace) is overflown at certain spots, which effectively means that the 'summer version' of the Osum River is widened. The summer gardens are now gradually submerged and transforming into seasonal wetlands. The flowering zones are overflown by small streams and ponds, the former mown reed paths transform into fullgrown reedbeds.
Small boulders (i.e. rocks) or tree trunks are used to steer the flow of the streams. The level of inundation depends on the flow rate of the river, and varies constantly

through the season, creating an everyday changing landscape.
The higher islands stay protected from the stream, as they are covered by the higher curbs. The grasslands are managed less intensively during this timframe, creating a safe haven for birds and animals. The first terrace levels stays accessible through the boardwalks, preserving as well the connection from the city to the islands.

High to peak water isles / designing for exceedance

During certain periods in winter and spring, the water level in the Osum River reaches the highest stages. While the first terrace level, including the curbs that mark the perimeters, are overflown by water, a small set of islands remains, the winter islands. This last set of plateaus is no longer accessible for pedestrians, providing a last resort for animals and birds within a now formidable river that almost covers the complete cross section. Peak discharge levels, occurring with return periods of 10 years or more will overflow all river islands, including the winter islands with relatively high elevations. To accommodate such discharge levels, it is essential that the interventions within the river bed do not create significant narrowing of the river section, which could increase the flood hazard for Berat. It is crucial that the level of the winter islands never transcends the height level of the quay of the city, to enable the submersion the islands, to accommodate the required discharge level within the river basin. During these particular floods, the first and second curb system secure the terrace levels, so they are not washed away.

It is essential that high and especially peak water levels (and the associated flood hazard) is communicated to Berat. After all, the level of the quays, the street levels and elevation of the built-up areas are historically based on observed peak river levels. These levels provided safety for the inhabitants and ensured sustainable occupation. To reinspire the century old relation to the Osum River, the rivers stages should become part of the city again. This is done by using the pedestrian bridge, that in case of high river discharge (i.e. flood hazard) is turned upwards. Depending on the lead time, and the flood warning system, the bridges can be turned upwards hours prior to the peak levels are reached. This symbolic act, can become a signpost for inhabitants, visitors to increase awareness and flood preparedness. This might be especially prudent in the coming decades, when climate change induced rainfall (possibly combined with snow melt) might boost river levels to unprecedented heights.

Creating multiple values / increasing usability, identity and livability in Berat

The main aim of the project is to activate the islands both as new places for the local community and as emerging entities, able to take a role in guiding the flow of the water and therefore in turning a potential crisis (the flooding) into a collection of diverse opportunities. Essentially, the intervention deals with the allowing of a next step of human actions towards the river: starting from the riverbed and the historical creation of a community and the foundation of the city, to the contemporary involvement in the transformation and maintenance of the city's identity.

Therefore the riverbed is regarded as the focus of the proposal. This position can be seen as an inversion of the common attitude. Rather than insisting on the river's borders, the center of the proposed actions is the riverbed, which is considered as the starting point to finally reach the urban environment. A trend is inversed: the city and the river, which are normally regarded as a dichotomy and therefore, as separated, opposites and antagonists, become coupled, aimed to give rise to a collaborative relationship between the natural and the artificial environment. The history of many Albanian and Mediterranean cities is exactly the story of this coupling. As such, we would regard the project, as the attempt to establish a tandem where the islands, the borders, the city and the local communities cooperate in the creation of multiple values and reciprocal benefits. The word tandem, which essentially refers to the ability of conducting and arranging things together, is activated through a series of landscape actions. Rather than focusing exclusively on the aesthetical side of the transformation, these actions attach flood risks through a landscape approach to new cultural possibilities. By reinforcing and making the islands a permanent part of the city environment, the flooding crisis can be treated integrally.

The project involves new relations in terms of cultural usability. The three islands allow for compatible activities. The Northern island could have a recreational function and facilitate festivities, linked to the historical center. The Southern islands hosts functions which are related to the ambient residential areas. The central islands might not be accessible, focussing

Fig3a / Plan drawing, low water level
source / competition panels

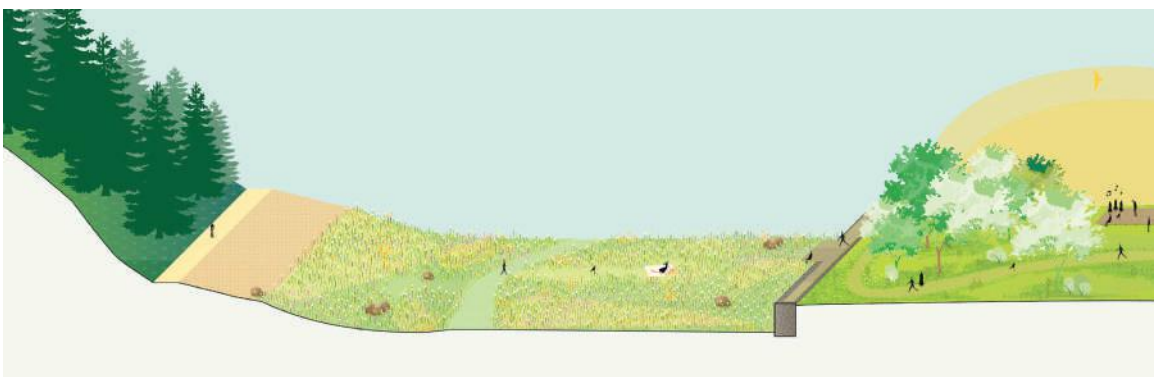


Fig3b / Berat waterfront
source / competition panels

Fig3b / Single stream, dry and accessible islands
source / competition panels

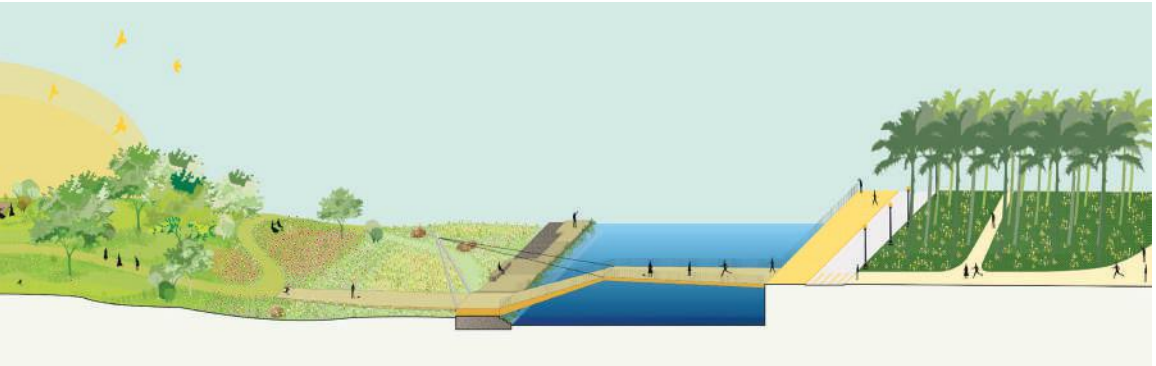


Fig3c / Section, low water level
source / competition panels

Fig4a / Plan drawing, high water level source / competition panels

Fig4b / Berat islands
source / competition panels

Fig4c / Wetlands, dry islands and large river
source / competition panels

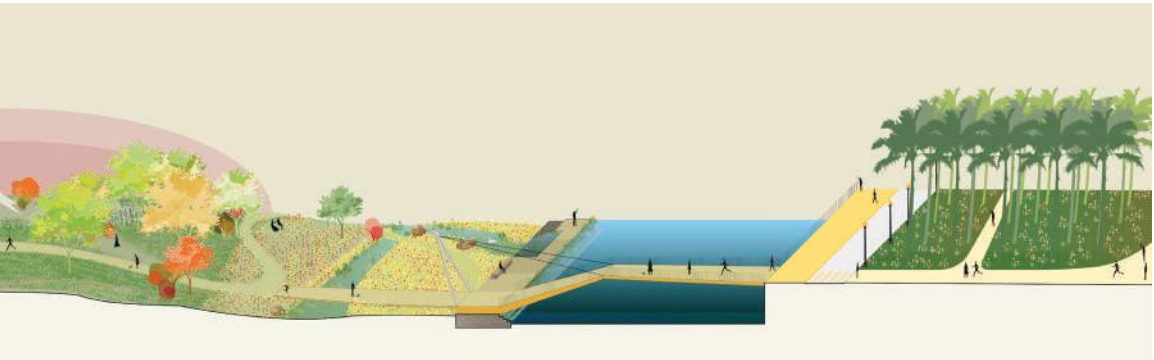


Fig4d / Section, high water level
source / competition panels

Fig5a / Plan drawing, high water level source / competition panels

Fig5b / Early warning, bridge is open
source / competition panels

Fig5c / Inaccessible islands, due to peak water
source / competition panels

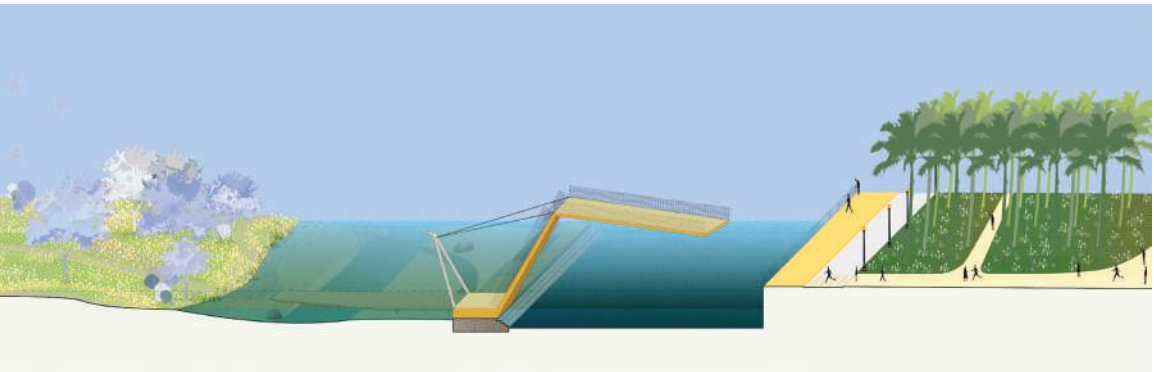


Fig5d / Section, high water level
source / competition panels

on ecological enhancement.
Increasing the uses on the islands involves a new possibility for the local community. Citizens (it might be for the first time) can watch the city from the riverbed, and through this get a better understanding of the values, arising from the relationships between the river and city, whereas each identity reinforces the other one. Along with activities like pick nick, walking in the nature, sport etc., the fundamental activity of knowing the ecology of the places where someone lives, becomes more relevant. To specify the use and programming of the islands, the project seeks to generate several layers of citizen's involvement. This could result in a wide range of possibilities: from proposing the island as a kind of reservoir for the incrementing of local biodiversity, up to the organisation of various activities and functions.

Berat is as well an important heritage site, resulting in substantial interest from visitors. The islands offer space to accommodate new leisure and sport activities, avoiding the transformation of the meaningfull historical heritage of Berat to facilitate these functions. Moreover these functions could establish a meaningfull interconnection between the historical and ecological values of Berat city. Standing away from the rhetoric of pure conservation, or on the opposite side the total transformability, the project creates a gentle negotiation between natural values, habits, needs and ecological crises, preferring more the way of compromise than that one of forcing. This attitude derives from the decision to handle the problem of flooding at the roots, suggesting an intervention which is regarded as a new alliance between nature and human activities, as to allow the ground snatched from the waters of triggering a cycle of life where human activity is excluded. It is definitely an intervention, which works in terms of viability, as both the city and the river, through a renewed co-existence could create a new layer of Berat identity.

Scaling things up / using seasonal isles as a strategy across Albania

Climate change and changing land use patterns (i.e. an increase of built-up areas and subsequent infiltration capacity) change drainage patterns and river regimes all over Albania. Seasonal variability will increase, which in practise means more severe and longer periods of drought as well as torrential rains and associated peak discharges. This alters the usability of the rivers and their relation to adjacent villages, towns and cities. A successful adaptation strategy to better cope with this seasonal variability thus has to accommodate reduced base flows in summer and increasing river levels in winter. The presented strategy is a first stage to re-establish the relation of built-up settlements with their adjacent rivers and ultimately, the catchment they are located in. Early warning systems already identify potential downstream floods by identifying peak rainfall and/or snowmelt way up in the catchment. In turn, the increasing areas occupied by sandbanks or low quality wetlands during the drier summers, are transformed into usable areas that allow for temporal (seasonal) use. Instead of withdrawing from the river and the emerging dry areas, the proposal attempts to utilize the opportunities the areas provide for the adjacent cities. Such a strategy is not only applicable to Berat, but could be extended to many other cities. Actual functions or activities can be tailored to local conditions, thus providing local solutions within a generic approach. Such activities can be developed together with local stakeholders to accommodate the needs of local communities.

The proposal also attempts to bridge the gap between hydrology, landscape and urban design, which is essential for the future development of flood and drought resilient urban communities. Scaling up the strategy could provide a boost for the development and application of new hydraulic river models, that can enhance knowledge and water management strategies within the urbanizing river catchments of Albania. Apart from Berat, this can be essential for the development of flood resilient strategies for urbanized areas further downstream within the river deltas. An additional benefit is the cooperation between local communities and regional/national government agencies by linking local developments to those within the wider area of the catchments. This could lead to improved knowledge exchange, empowerment of local communities but also to a more coherent and integrated development of a future Albania. In conclusion, the project includes a community involvement, which results from the restitution of the river back to the community itself. Only through the opportunity of making experience of the river by discovering its unique characteristics, a virtuous cycle of affection and understanding of the local ecology could be triggered. The project therefore, also seeks to involve an eminent pedagogical value.

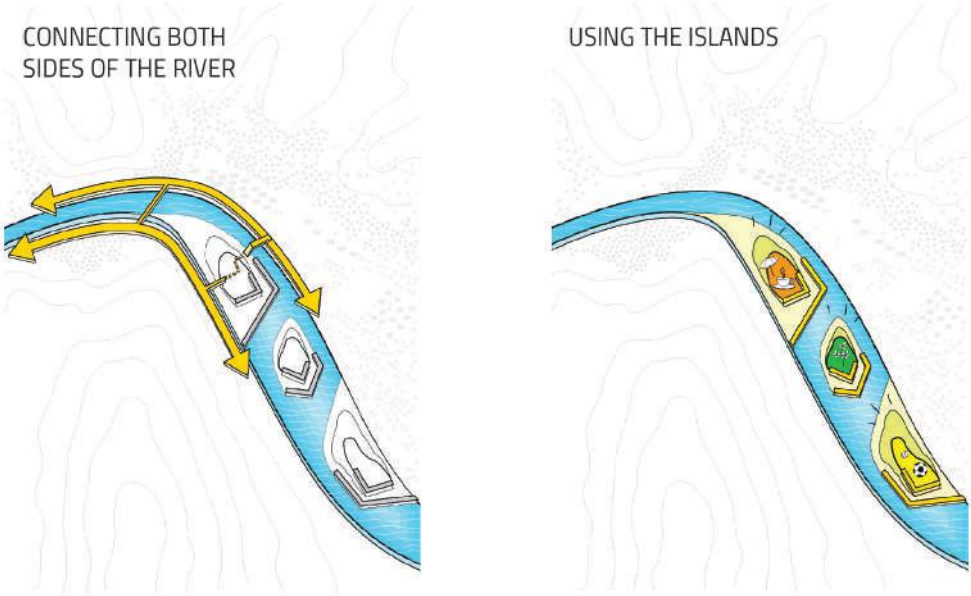


Fig6 / Connection diagrams
source / competition panels

Flexibility, phasing and community involvement

The developed approach is relatively robust to a variety of design proposals, i.e. different designs can be developed without compromising the developed objectives. This relates to:

1. Number of islands / The current proposal consists of 4 islands, incl. 4 distinct curbs that divert the stream flow. Alternative options (e.g. 3 of 5 islands) are possible and require different dredging efforts and require a different layout of the curbs.

2. Curb construction / The current curbs are developed from gabion baskets, which are flexible and can be easily deployed on site. Yet, they might require maintenance and might limit the usability in relation to the development of pedestrian routes and attaching structures. The curbs might therefore alternatively be constructed from concrete. This in turn, requires a more elaborate construction process.

3. Curb and platform heights / The terrace levels are based on the mean seasonal river levels. To our knowledge, no river gauges have been installed at Berat thus only a limited number of records might exist to estimate those levels. By setting up a 1d hydraulic river model, calibrated using measurements from other stations, statistically significant predictions can be made. Still, climate change as well as upstream developments could require that the terrace levels to be lowered or heightened after initial construction. The design needs to be further elaborated to accommodate such changes.

4. Integrated functions / The islands can host a number of temporary activities. The projected football pitch can easily be changed into some other recreational facility depending on the local community's requirements.

5. Bridges / By far, the most costly intervention is the proposed drawbridge. Alternative designs might include other options for movable or even fixed bridges. These might include floating pontoons to ensure adjustment during variable water levels. Also, the materialisation and detailing of the bridge significantly influence the implementation and maintenance costs.

The flexibility regarding the actual design also extends to the phasing of the project: the project does not necessarily need to be implemented all at once. Construction of the curbs can be on a one-by-one basis, to for instance study the effects on the changes in island morphology due to the altered sediment deposition and deepening of channels. Also the construction of terraces at different elevations can be phased over a longer period of time. In this case, only the provisions for the "summer island" are constructed. In a secondary phase, the construction of the late spring/autumn terrace level and finally the winter/early spring level can be be constructed.

Apart from involving the local community in the choice for temporal functions located on the island(s), the community also might play an important role in maintaining the river and islands. Since the project's aim is to connect the islands to the city and

make them literally accessible, the local community also can play a role in upgrading the quality of the islands and the adjacent streams. Apart from flood hazard, Berat also has to cope with significant amounts of solid waste that are dumped in the Osum river. Especially, during the dry periods, much of this waste is ending up along the embankment and on the sandbanks. Apart from the obvious effects on water quality and the environmental impact downstream, the dumping of waste also affects the attractiveness of Berat which ultimately has effects on tourism.

Future outlook / developing best practises and obtaining funding

The project is aiming for better integration of river management and urban development. Although the interventions are relatively modest, the project might prove to be a pilot for developing best practises by:

- Integrating urban usability with flood and drought management;
- Connecting early warning with flood risk awareness (i.e. urban signposts);
- 'Building with nature' within the riverbed;
- 'Water sensitive' design based on seasonal variability;
- Developing best practises might give the project an advantage in finding external funding (e.g. World Bank financing).

Especially if the project is embedded in a regional or even national strategy and the effects on sustainable future river management can be demonstrated, external funding opportunities seems feasible.

Fig7 / Night view of Berat waterfront source / competition panels

Financing

At this stage it is virtually impossible to develop a decent cost estimate for the project. Both the Albanian pricing system, regulatory framework (that might opt for significant constraints or changes) and ultimately a critical set of design decisions by involving the local community (see Community Involvement) might significantly impact the actual project cost estimates. Nevertheless, the project has been aimed at low cost-high impact. The interventions are relatively modest and do not require costly dredging or the construction of sheet pile walls to create a dry environment for the construction of broad foundation works. The proposed use of gabion baskets, ensures low implementation costs and flexibility. The most costly element in the design is the proposed bridge. Yet, depending on the available budget, the bridge can be designed within the available financial means.

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5

gjakova europan

The adaptable city 2 / europan 13 theme
T3 / Object versus project (process)

from the call "The adaptable city 2 / europan 13 theme"
EUROPAN Federation

Introduction

Europan needs to adapt to the changing conditions in the production of urban and architectural environments and encourage new ways of designing and producing spaces. With the support of the Scientific Council, and on the basis of 42 contributions by experts from every European country on the possible theme for the 13th session, Europan is proposing to extend the theme of "the adaptable city" by taking account of three main changes in the conditions of production of European cities.

The first change is less Welfare State and more self-organization. One of the issues that professionals now face is that we cannot expect the Welfare State to continue in the same way as it has for the last 40 years. Europan is one of its "children", making the public dynamic the main urban driving force, with a very dominant role for municipalities.
So although they are still our main partners, providing sites and content for the competition, we now need to look for a wider range of clients. Sites should no longer be sponsored entirely by municipalities, but perhaps in partnership with private entrepreneurs, with participatory groups wanting to build for themselves, perhaps with action groups employing new forms of activity in urban planning and architecture, to change and adapt the city.

The second change lies in the idea that we live in a paradoxical society which has more than it needs, sufficient material resources, but uses them very badly. Therefore, not only for ethical and moral reasons, but also for reasons of fairness, society needs to move towards a culture of sharing, because what we have needs to be better used in the future. The reasons are therefore economic, but at the same time, of course, we need to make our societies more cohesive, and sharing public space, for example, is a significant way of achieving this.

The third theme is about the object versus the project (process). In the future, in a sustainable, resilient city, architects need to be more responsible in what they do, they need to produce their projects over time and they need to become responsible for the "maintenance" of their projects, their adaptability to the needs of new users. This means that they are not just responsible for the object itself, but also for the process through which the project evolves, and the question of adaptation to uses will increasingly be the architect's responsibility.
These three themes – self-organization, sharing and the project (process) – are the themes that Europan is proposing in this session as the "problematic context" for the choice and content of the sites and as a basis of ideas for the competitors. Through this broadening of the theme of the adaptable city, Europan is seeking to contribute to the incorporation of these changes into professional practices.

The adaptable city

It is proposed for Europan 13 to continue with the generic theme of "the adaptable

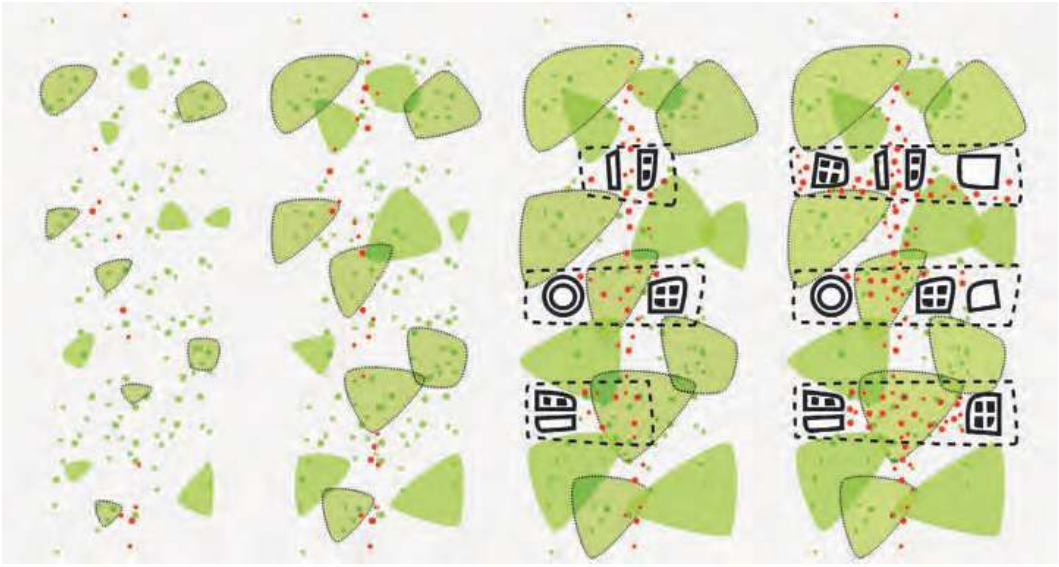


Fig1 / E12 winner project - Saclay (fr) / lieu(x) de négociation(s)
source / E13 official call

city": adaption to the need for more sustainable development but adaption also to the context of an economic crisis that the majority of European cities are currently undergoing.

Three generic concepts structure this overall theme:
Resilience as a challenge / to be able to extend or find again the identity of the city's structural elements (built or landscaped) in a context of significant changes.
Social adaptability as a goal / reconciling the coherence of these structures with the evolving uses and practices.
Economy as a method / managing urban transformations in different contexts of actors and means, yet with limited resources and in the era of the "post-oil city"

T3 / Object versus project (process)
With communication tools and social networks in the rising, our culture grows less object-based; and this phenomena affects architecture and urban planning.
Many young architects are emerging through the implementation of projects presenting less physical objects, yet where the scope of the projects is as important as the objects involved. The objects can already partly exist and the project is about managing the existing, dealing with social constructions, developing a context and raising the question of "urban planning with less or without growth".

a / Contexts and not only sites
The project can become one additional "layer" over a context, without a clear predefined outline for the intervention on the ground - a context that may also be social, cultural or economic and not only physical.

b / Programmatic innovation
An open question may lead to an unexpected answer. There may be room for programmatic innovation, even redefining the relationship between programme and physical support - both the question and the answer may only be about reprogramming the existing.

c / New implementation process
Focusing on the project in its level of appropriation rather than on the object may imply redefining the implementation process.

d / Innovative representation
How can we describe a social context or a question of identity? What can we give as information to stimulate the research of opportunity areas? And unusual shapes of representation may arise in this context because a classical render of the project may not be very adapted to describe this kind of projects/processes.

GJAKOVA [RE]PACKED
Competition report

IF / Innovation Factory

project leaders */ Dea Buza, Renis Batalli*
collaborators */ Eranda Janku, Pegi Shima, Perla Qordja*

Dissolving the city in all its elements and re-packing everything again by empowering physical and cultural potentials, social structures and economic drivers: designing an architectural toolkit, as a method for promoting resilience and sustainable development.

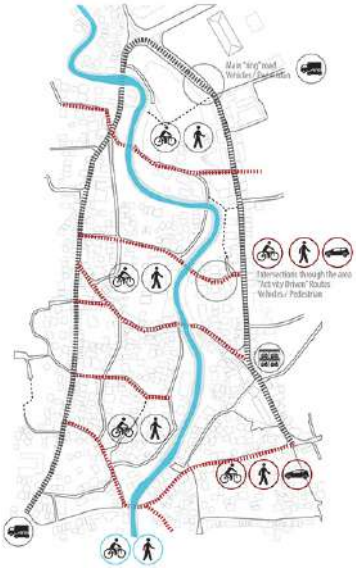
Repacking the city

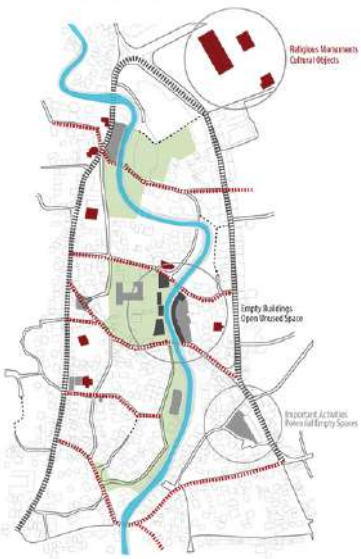
The economic crisis, and now recently even the social crisis (exodus) is evident, and it's not only a local issue. It has many layers and it's putting to question a lot of models, which we have built and we follow nowadays. In order to get conscious and redevelop economy and society, we need to start understanding the problem and give answers to it, not only globally, but especially locally, providing employment, better living conditions and equality.
"Gjakova Repacked" starts with the re-conceptualization of the functional layers of Gjakova, setting a priority-frame and then focusing on the project area, as the area, where all potentials derive and accumulate. Redeveloping this core area becomes not only the aim of the project, but we believe that once this core area is re-developed, it can be a good model to replicate and it can stimulate development in the rest of the city.
We put to use all the potentials that we found: natural assets, religious tolerance, rich history and traditions, by creating a framework on which they can integrate, cope and act as catalysts for promoting economic development. By creating opportunities for promotion, employment and public involvement we aim to make people the main key-actors of the manifestation of these potentials, and of this development framework.

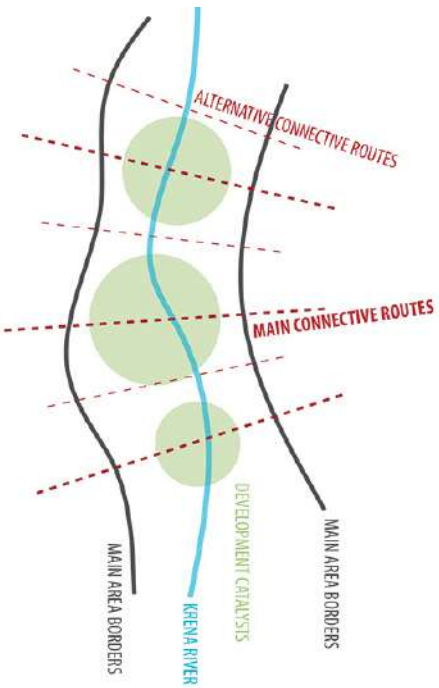
Concept / Connect physical component

Use the main economic roads that border the project area for implementing the Smaller Ring Road of Gjakova, an area where all the main industrial and trading activities will be based, and where the main vehicular circulation will function. Three main connecting routes will connect each side of the ring road and will make possible the entrances within the project area. Only these roads will be open for car access and main traffic circulation, promoting a car-free area within the project site. Implementing this infrastructural concept, asks for the arrangement of parking spaces as well. There are 7 main nodes that contour the site and the ring road, and these spots are also the main key areas for accommodating parking spaces, preferably vertical parking to efficiently use the land. Once the issue of parking is solved, pedestrian and cycling movement will be easier to implement within the ring road.

Using the space along the river flow and designing more frequent links and bridges for linking the two parts of the city is also one way of promoting a better connection.







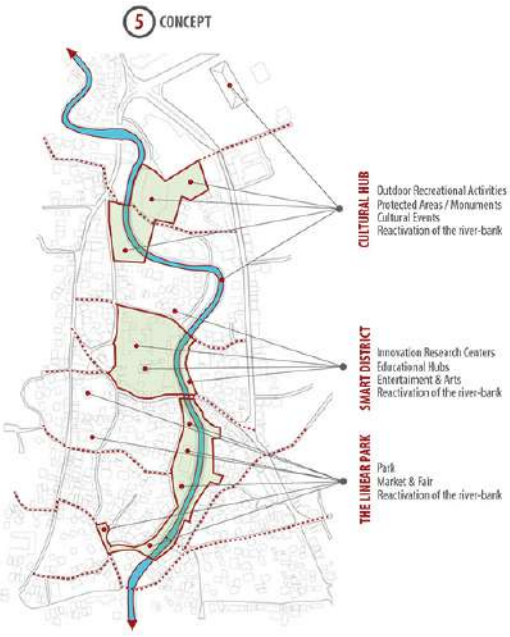
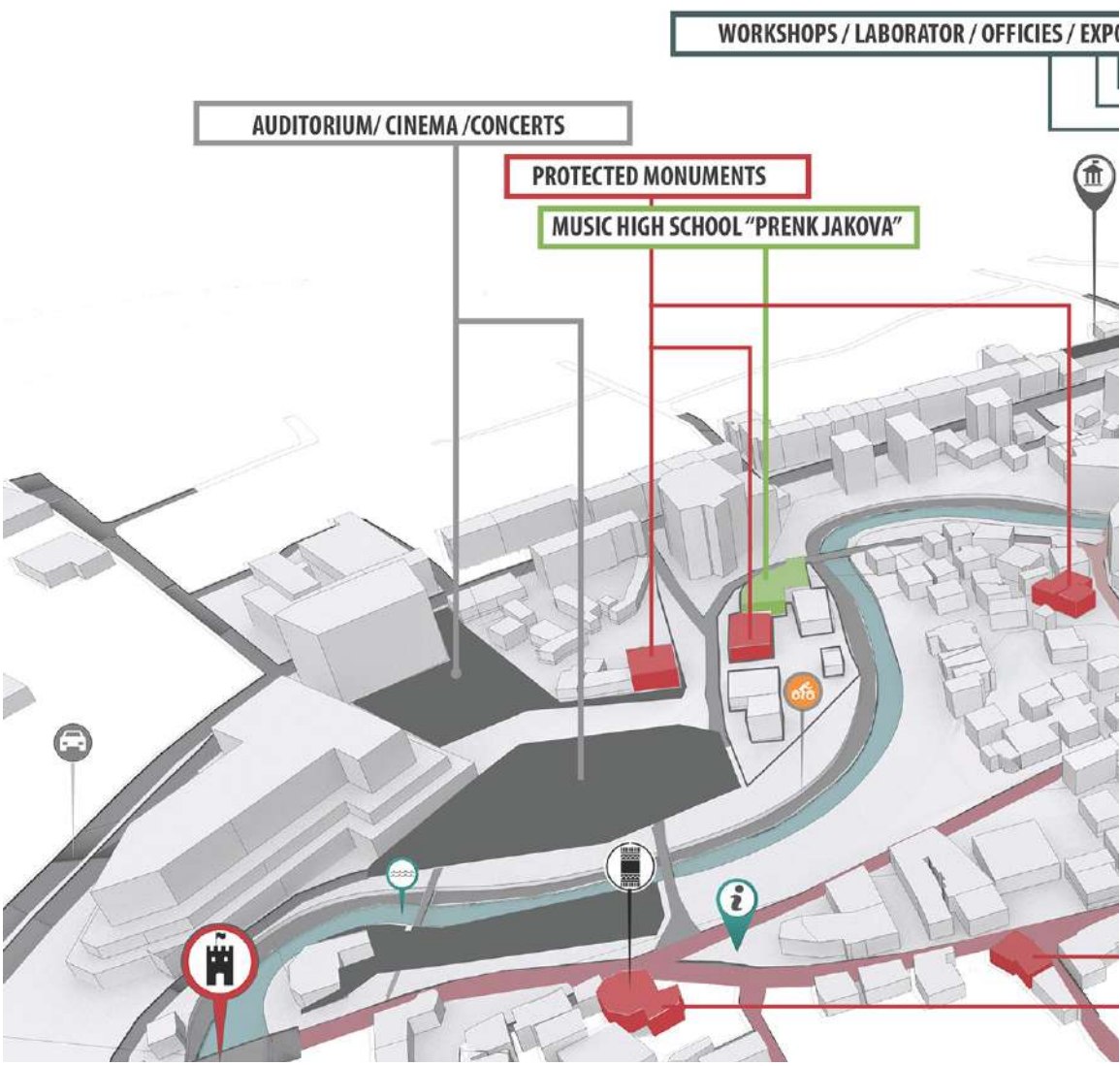


Fig 1 / Concept schemes
source / competition panels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MUSIC HIGH SCHOOL "PRENK JAKOVA"

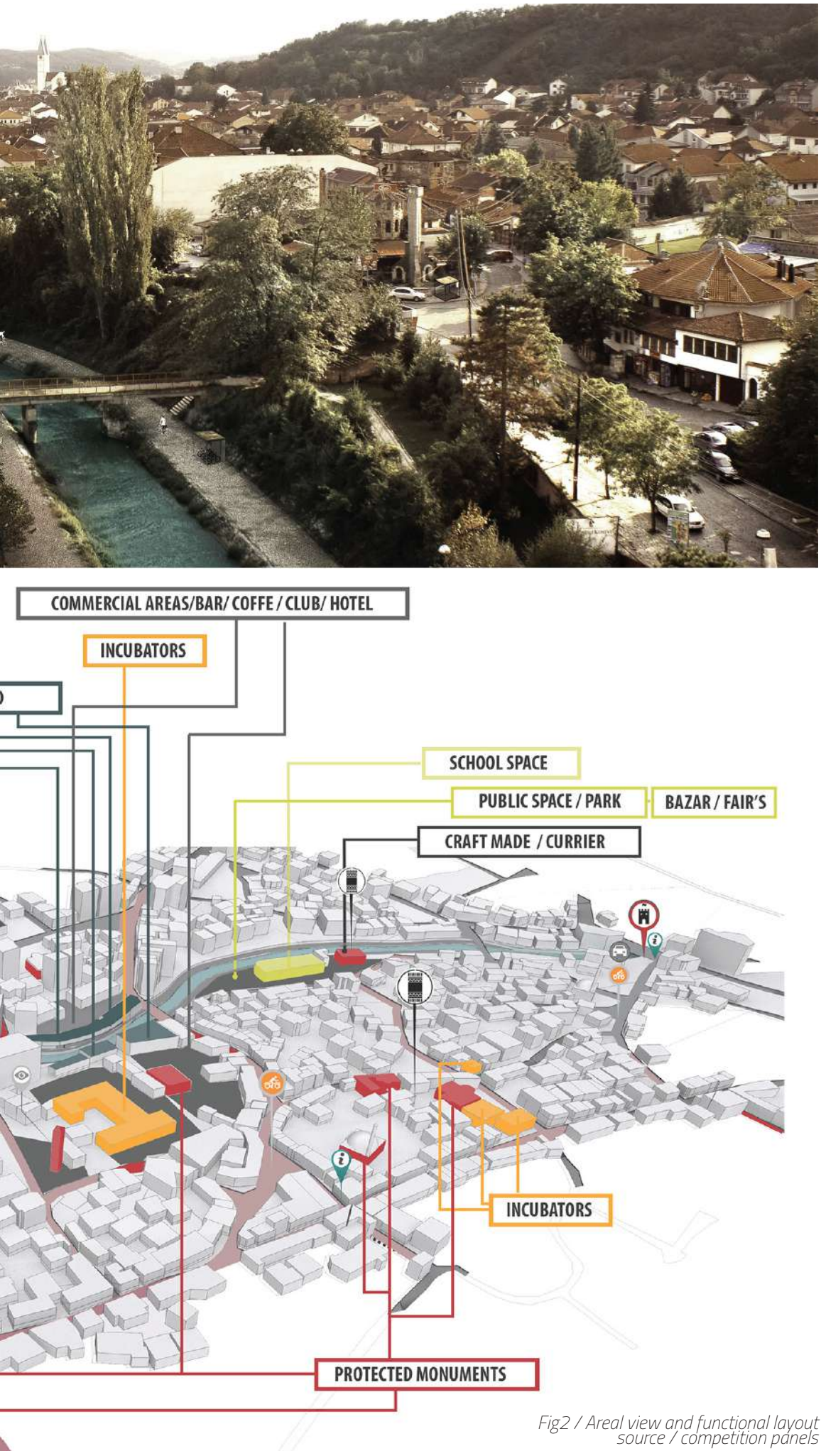


Fig2 / Areal view and functional layout
source / competition panels

A continuous green pedestrian and cycling route is proposed along the river, creating a linear park, which stands beside the built, co-exists with it and complements it.

Concept / Infill process

Although because of its history, many layers represent the city of Gjakova today, the city hasn't still been built aggressively and there are many potential spaces (either built, or not) to be used within the city, and especially within the project area. We cannot prevent development and building, so we have to find a common ground for preserving the historic city while creating space for new developments.
We identified three main potential areas, which we consider as catalysts for the redevelopment of the city. Each area is organized around a main activity or important object, which we consider on our proposal for redefining the identity of the city:
- The Cultural Hub (Area No.1- Music High School District);
- The Smart District (Area No.2- Incubators' District);
- The Linear Park (Area No.3- Riverside Elementary School District).
The nowadays economic and social crisis need new approaches towards what we call tools for development. It is time we think and invest more on participatory processes, which are able to bring and ensure development that adapts to the people's needs and capacities, in front of limited resources, unemployment and scarce land.

Concept / Activate by Design

We aim to redevelop the area and beyond that the city, by tailoring a functional program, which links and creates a series of events and activities that happen in the city, activating social structures, economic drivers and physical spaces.
In order to make space for new developments, we conceptualize and design a special toolkit, which adapts to specific activities and functions. The toolkit works on a modular basis and can be easily produced in Gjakova, using traditional handcrafting techniques and local materials like metal and wood. The structures permanently settle on specific locations, but the size of the implementation changes on time based on citizen's needs and capacities, being able to cope with any context, or situation. The toolkit is not only able to settle and implement on open empty areas, but it can also cope with existing structures (used, or unused).

Interventions / Repacking and Infilling the 3 main catalysts

The Cultural Hub / Area No.1 Music High School District

The Cultural Hub is the new living "art gallery" of Gjakova. It is an agglomeration of spaces dedicated to promoting start-ups for art and culture in the city. The outdoor and indoor auditorium, the concert stage, the outdoor cinema and the pavilions, are spaces created by using modular structures from the toolkit we've designed, and dedicated to the people of Gjakova.
The area integrates with the river as well, creating a park and it's at this point where two important itineraries start and continue as the river flows towards the other part of the city: the pedestrian pergola and the cycling route. By re-designing the riverbank these two itineraries continue in a linear way along the river, and a series of small bridges and links, connect the two different parts of the city, across the river. Modular structures from the toolkit are used in both cases for re-concerting the use of the river in these different ways.

The Smart District / Area No.2 Incubators' District

The Smart District is a sustainable district, which develops itself using the actual potentials and builds upon them for the future. The whole district will be used for organizing complementary activities that use the innovative basis and develop further into different activates: workshops, spaces for open lectures- trainings- research laboratories- and other experimental spaces, which will push further the development of economy based on technology, innovation and research. Incorporating spaces for social activities and interactions, will also contribute to building a culture of education based on innovation and technology.
Handicrafts and traditional production ways will be taught and promoted on this area as well. Spaces designed especially for these workshops will be dedicated to learning courses on different topics: wood processing, embroidering, cooking, leather and wool processing; opening the city not only to the locals, but to the whole world. The inhabitants themselves, together with the best professionals will be the main actors to put to work the net of workshops, which will be planned on a daily-weekly- or monthly basis, manifested with fairs and exhibitions for promoting all the production. Local schools and businesses can also be part of the clustering, providing learning practices, work force and products' market. This practice will retain

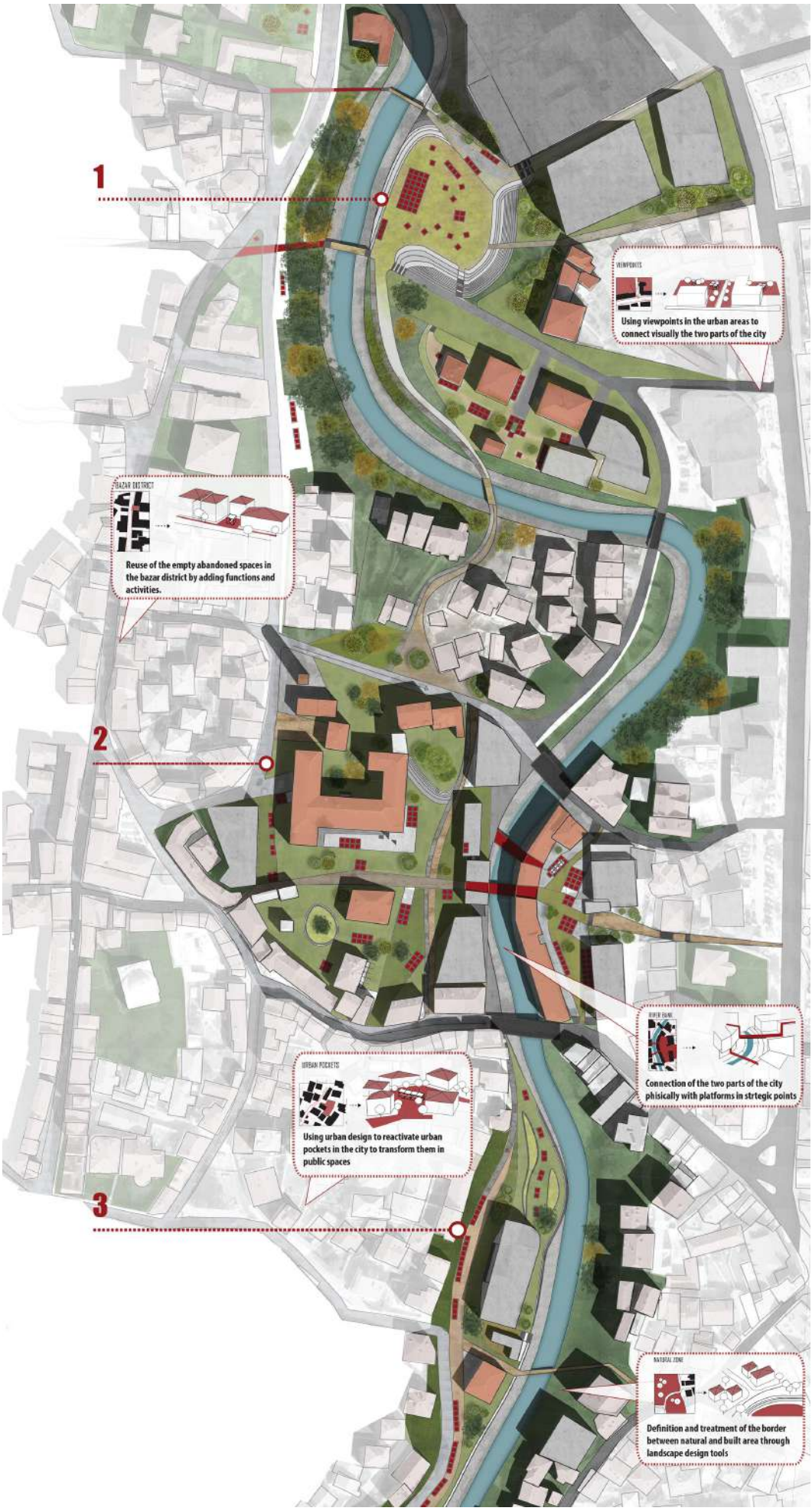


Fig3 / General Masterplan
source / competition panels

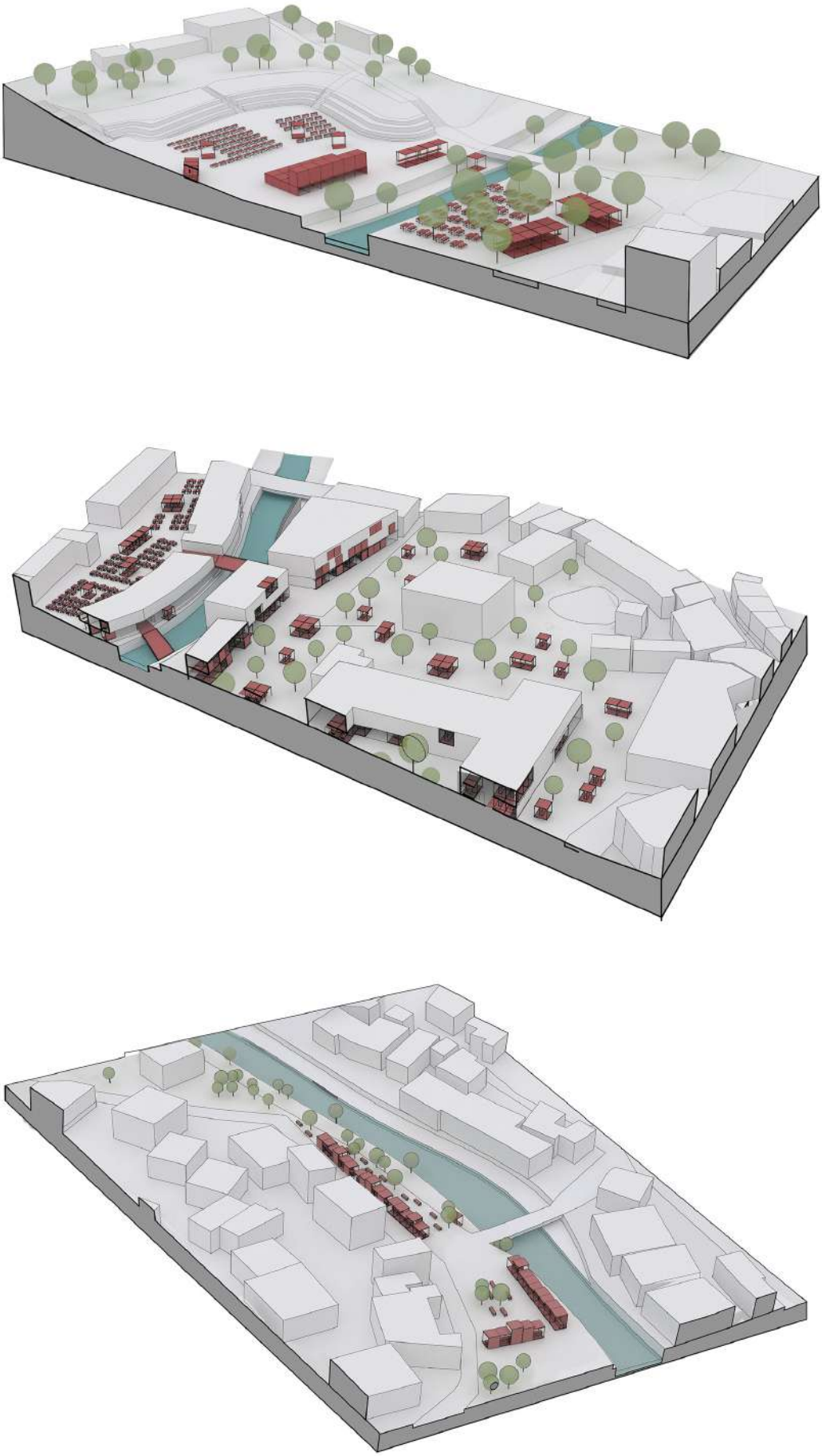


Fig 4 / Zooms axonometries
source / competition panels

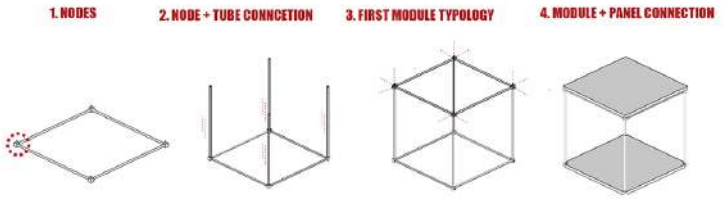
Fig5 / Project views
source / competition panels

and sustain the traditional production and processing of the main local materials on the short and especially on the long run.
The district offers several empty unused buildings near the old bazaar, and we use such spaces for implementing different activities. Those empty buildings near the incubator are used as spaces for classrooms, offices, exhibitions; and also bar, hotel, and restaurant. This district will offer dedicated spaces for research and innovative projects for the schools of the city, giving them the chance to grow and develop in the midst of the Smart District.
Meanwhile on the other side of the district, embracing the "trading" character of the city, the empty unused buildings will feed the need of the bazaar for more space to use, creating new opportunities for employment and reactivating the social

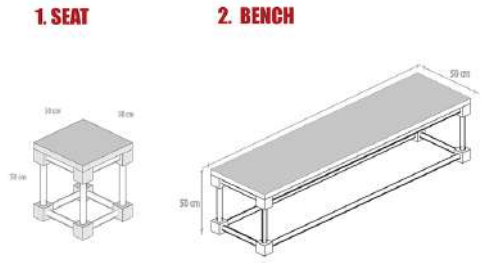
The Linear Park / Area No.3
Riverside Elementary School District

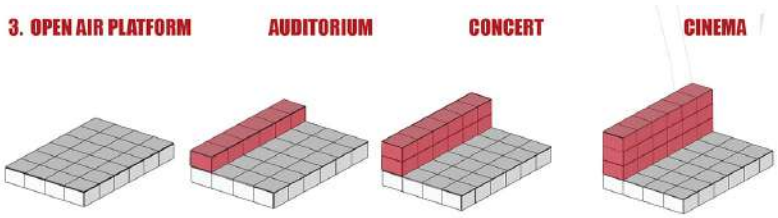
The Linear Park is a more intimate urban area in order to provide more security for the kids of the elementary school and for the inhabitants of the private homes. We still enhance connections with the rest of the project site and the rest of the city, but the whole area is thought as a linear park along the river, which through landscape interventions creates different atmospheres for different users. The park accommodates the bio-food market as well, which promotes local production of fruits and greens.

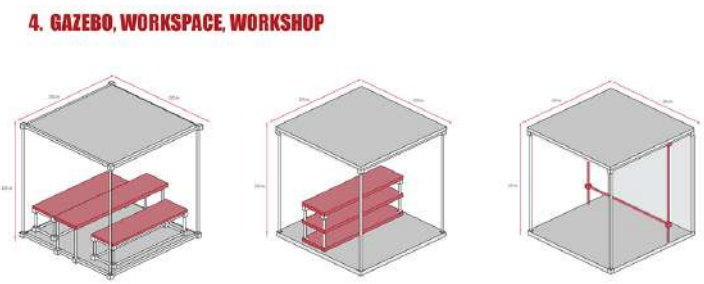
HOW TO BUILD IT

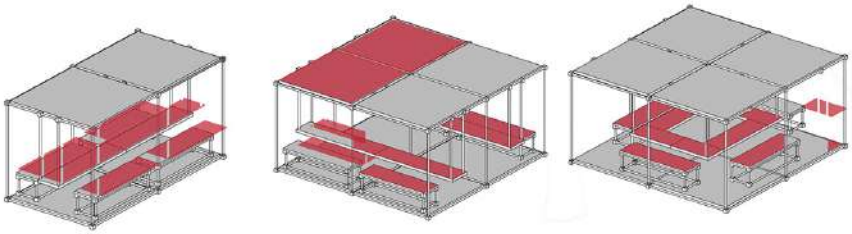


MULTIPLE USES

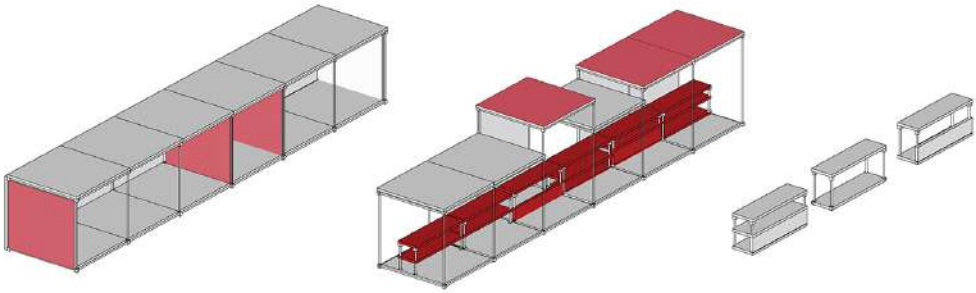








5. MARKET & FAIR



5. EXISTING BUILDING INTERUPTION

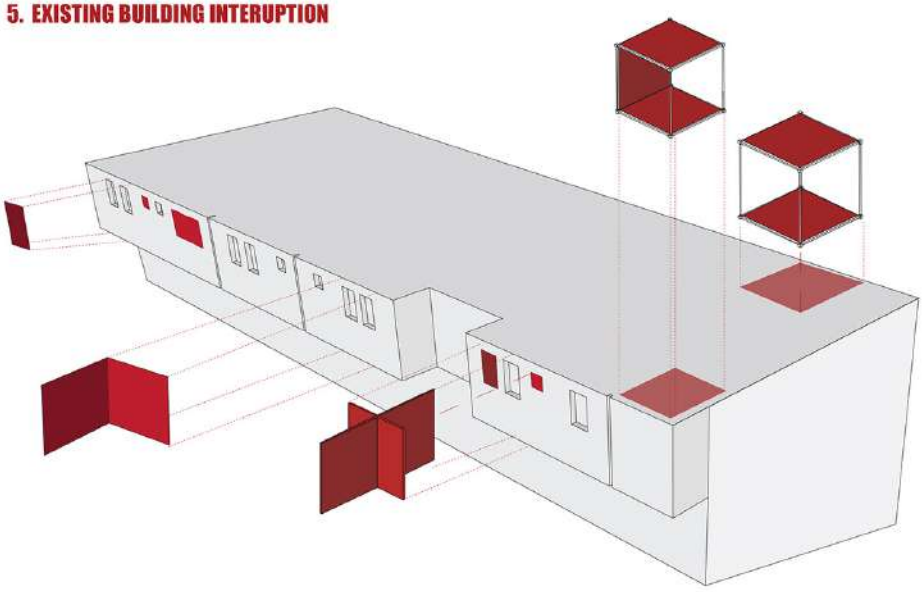


Fig6 / Module building process and view source / competition panels

6.1
Conclusions / The Importance of 'Watersheds' and Related Methodological Proposals

Besnik Aliaj, Ledio Allkja

6
conclusions

Conclusions / The Importance of 'Watersheds' and Related Methodological Proposals

Prof PhD Besnik Aljai / Rector of POLIS University, Tirana
Ledio Allkja / POLIS University and Co-PLAN - Institute for Habitat Development

The Role of Local Experiences in Spatial Planning Processes

The fall of the authoritarian regime in Albania by early 90-s, opened a new chapter of developments for the country. The transition from 'centrally planned' economy towards 'free market' combined with the change towards pluralism and democracy were and still remain one of the greatest challenges of the country. The relatively weak state with limited capacities to govern the society towards democracy could not easily reform the planning system in order to be able to respond to local and societal changes, resulting in a total freedom and potential anarchy for the territorial development.

The fragile democratic system during transitional Albania could not respond immediately to the local social-economic demands and was not able either to plan in due time, therefore leading through misunderstandings and "systematic allergy" towards territorial/urban planning. The resulting chaos with uncoordinated/unplanned development resulted with over 400,000 informal and illegal dwellings. The latter had strong impacts on the fragmentation of rural/agricultural land, especially along surrounding areas of the main cities. It also increased pollution and environmental degradation, high cost of infrastructure provision and pushed for more chaotic and informal urban development within the cities.

On the other hand, the transition period proved to stimulate the creativity and energy of people. Frustrated by the slow reaction of governments, people took matters at their own hands by investing in property and economic activities. However, the absence of a clear economic policy and poor financial credibility by the banking system, directed citizens to invest most of their earnings towards "dead capital". Thus the necessity for territorial/spatial planning was urgent but it took almost two decades of chaotic developments for the political and professional milieu to prepare for initiating reforms towards formal and positive planning and developments. Only at this point one can speak for objectives aiming to correcting mistakes of the past and set platforms for the future.

In this retrospective, different attempts were made in 1992 and 1998 to introduce and institutionalize urban planning system through the respective legal acts. But both legislations could not grasp the complexity of the new democratic system and respond to the demands of the new socio-economic system, thus they failed by losing political priority. Meantime by early 2000-s the Municipality of Tirana initiated relatively for the first time new tactics for changing the situation at city scale. And this was replicated quickly by other local authorities. However, it took up to 2006, to enter a real process of designing a new planning system, which reflected a comprehensive and integrated approach towards spatial planning. The initiative culminated in 2009 with a new legislation on "Territorial Planning and Development", which would enter in force in 2011 after the preparation of bylaws and detailed regulations.

Most of these activities and changes during the transition period have been subject to the continuous support and assistance from foreign actors such as the World Bank, UNDP, USAID, GIZ, ADA, IHS Rotterdam, etc, combined with the process of European Integration and its pressure for positive change. But the legislation and the creation of governance structures is only the "top of the iceberg" for real cultural changes. Nevertheless, a legislation can change even overnight, but to change a planning and governance culture requires time to mature and become institutionalized. This appeared quite an intrinsic and complex process in Albania that required the change of frames, values, beliefs and mentalities of planners, officials and practitioners, as part of general socio-cultural understanding of certain processes by the citizens themselves. Thus, the role of foreign actors is important, however, their impact in the cultural change in Albania would be limited without the support and partnership of local epistemic communities and actors.

The story of the evolution of Co-Plan Institute (www.co-plan.org), and later on of Polis University (www.polisuniversity.edu.al), shows how important local expertise is in shaping processes of change and modernization in a developing country like Albania. Co-Plan and afterwards POLIS University have been at the forefront of most issues related to urban development, territorial planning and development, territorial governance and administrative reforms, trying not only to shape legal and institutional frameworks but also by continuously engaging local communities and general public, in an approach which aimed at establishing and consolidating the capacities of institutions. Their success story is based on the fact that international experience has not been just "copied" within the Albanian framework, but it has been contextualized through scientific and practical research in order to best fit the countries needs as well as by creating new knowledge and methodologies. The production of context based research, methodologies, projects and alternatives have proven to be a key factor in shaping the cultural change in territorial governance.

These local experiences only iterated the eminent necessity of drafting regional and national spatial plans and policies, which would support the development of the country and serve as a reference for the coordination of local initiatives. As a response to that - by 2014 - "Albania 2030 Manifesto" was published with the aim of offering a new methodology and a vision towards the national authorities for drafting the General National Territorial Plan of Albania. This initial research document served as a key reference for the authorities in drafting the official national document/plans, but at the same time showed the necessity of an intermediate level of planning such as the regional one. As such, the research publications of the International PhD workshops of Polis-Unife are new contributions in such a historic timeline. This last publication concludes on 'watershed-based planning' as an important contribution which can

be used by authorities in response to the question of regional planning and regional development, especially under the conditions of climate changes, and growing concerns from flooding and environmental pollution.

The Importance of 'Watersheds' and Related Methodological Proposals

The combination of the different disciplines is one of its strongest points in developing a new methodology for sustainable planning at the regional/national level. The amalgamation of planning contributions with landscape architecture, environmental studies and engineering, with good governance approaches and architecture; which makes this a unique publication which is based especially on Polis/Co-plan experiences. It is also offering good theoretical and practical sustainable responses to the local and regional challenges of the day.

Watersheds are a useful planning level which can offer sustainable solutions for development. Being a natural ecosystem at first, they guarantee that the ecological sustainability of the plans and measures to be taken in response, and not only to the local challenges but also to more global ones, such as climate change. From a methodological point of view, the workshop experience emphasizes the necessity of a multidisciplinary approach in developing territorial strategies at this level. Watersheds, offer a complex system which take into consideration a multitude of interests, values and development perspectives in their relationship vis-a-vis with ecosystem values. Thus the watershed can be planned for and managed in an integral fashion and through comprehensive, yet practical and targeted instruments. The latter is also supported by the fact that also from an institutional and governance perspective watersheds fit well within the framework of multi-level and multi-layered governance, thus integrating a wide range of actors, institutions and agents at different levels.

Looking at the 'Semani Watershed' case per se, we see that it is faced by the dichotomy between 'economic', urban development and infrastructural development, against the necessity to protect the environment and the biodiversity. Especially, the high number of planned hydro-powers is an imminent threat to the watershed and the biodiversity, thus according to Muharremaj, V., in this publication, it is highly important to avoid the construction of dams and aggressive/massive infrastructure works in high biodiversity areas with sensitivity. In addition, it is highly recommended to support the development of ecosystem services and climate change adaptation measures. In addition to this, hydropower plants should not be seen as the only alternative for the provision of electric energy. Other options such as sun energy can be used in a complementary manner with actions taken at the individual building level for increasing energy efficiency and savings.

Emanueli, L., and Lobosco, G., add to these concerns by introducing the concept of riverscapes and the importance of not only preserving landscapes but also to plan and design them accordingly. Especially, the development of hydropower plants in Albania is one of the main threats for changing landscapes and preserving them. Their view of a 'new' planning approach and framework " … blurring the boundaries between disciplines - such as engineering, landscape planning, geography, economy, etc. - is a paramount concern to shift the viewpoint having a more holistic approach to the subject of waterscapes evolution … " (p.68). The importance of landscape is reiterated also by others and comes as a recurrent topic throughout the publication. Thus it is advocated the necessity to try and create an equilibrium between environmental quality, economic activities and society's needs, promoting the development of sustainable tourism, which considers the landscape a collective good and inheritance for future generations.

Agricultural activities play also an important role in polluting the rivers and water basins. The increased use of fertilizers and other chemicals combined with pollution from formed industries and urban development poses a threat not only on waters but on the whole 'food system value chain' in Albania. Most of the agricultural lands in the area get water from the river, thus creating a vicious cycle of pollution which directly affects the health of people. Erosion in addition is an important factor threating the watershed hence forestation and vegetation densification is very necessary. Thus the riparian area of rivers needs to be aggressively and strictly protected at all means. With regard to restoration of water quality in the watershed, and in line with the above initiatives, an interesting perspective is also the inclusion and use of natural measures for the reduction of pollution through phyto-, hydro- and biological depuration.

The watershed has also substantial and important natural reserves and protected zones which are a high potential for the development of sustainable tourism. As advocated by Porfido, E., tourism used in a prudent way, with low impact activities based on the eco-tourism approach can offer a good basis of economic development for the watershed region. In addition to this, cultural heritage plays an important role for tourism development and adds another layer to it. It is argued that historical and cultural heritage offers a great potential and thus should be valorized and become part of the touristic offer.

Furthermore, is an imperative now that climate change is the paramount threat of all watersheds. The increase of extreme weather events such as flooding and droughts is evident. Thus building a resilient future requires new methods and approaches in designing and planning.

According to Van Driessche, M., and Veerbeck, W., advocate for a new approach of building with nature, offers the adequate tools for creating a design strategy for rivers and islands that is resilient for all types of extreme events including flooding and droughts. As such, flexibility is an important matter in the projects/plans allowing for the shaping of activities accordingly providing a more robust future. Resilience is an important concept also for Palazzo, A., who argues that " ... nature management, agro-clusters, rural services and the role of design as a tool for local resilience, are all fundamental principles to achieve the sustainability ... " (p144).

In relation to resilience the two competition projects designed by Metro_POLIS Studio (Albania) and Felixx (the Netherlands) offer two interesting and distinct illustrative approaches on the topic. Felixx proposal is based on the manipulation of river flow patterns in a natural manner to offer a flexible space which can absorb and live with water in cases of flooding. Meanwhile Metro_POLIS propose a more complex and sophisticated approach through a series of intervention based on the concept of "dynamic edges" which try to offer a symbiotic solution between nature and city in achieving resilience. Both projects show that besides technical and engineered solutions landscape architecture and "designing with nature" can play an important role in finding solutions for the near future.

This conclusive publication and the respective international workshop have offered a unique viewpoint from a theoretical, methodological and practical solutions for the sustainable development of watersheds and especially for the planning of watersheds. Most articles, although focused in different themes, are interrelated and hint at the importance of having an integrated approach not only from a sectorial point of view but also from an interdisciplinary perspective. Therefore, landscape under such context is seen as a unifying concept for the above mentioned, and there is absolutely a great need to further develop methodologies and discussions about landscape in the Albanian context. Thus, with this in mind, there is no better way than to conclude this publication with a comprehensive definition of landscape by Metro_POLIS (p.216): " ... Landscape is an open system, it is a MEDIUM, uniquely capable of responding to temporal change, transformation, adaptation, and succession. These qualities recommend landscape as a medium uniquely suited to the open-endedness, indeterminacy, and change demanded by contemporary urban conditions ... ".

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