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It is my pleasure to present the achievements of the INTERREG CE89 LUMAT project „Implementation of Sustainable Land Use in Integrated Environmental Management of Functional Urban Areas“ in this issue of TERRA SPECTRA Planning Studies.

The LUMAT project objective has been the implementation of sustainable land use in integrated environmental management in seven Central European Functional Urban Areas in the countries of Poland, Slovakia, Czech Republic, Slovenia, Austria, Germany, Italy and their pilot projects with two pilot investments in Poland and Slovakia.

Central European space is facing multiple challenges. Dominant part of them are joint challenges with the other parts of Europe, resulting from global processes e.g. climate change, urbanisation, societal transformation towards civic society, development of knowledge based economy or migration. In addition, the specific historical, societal and geographical preconditions derive specific challenges, threats and problems. The broad scale of the problems in the spatial development in central European space is a challenge for spatial planning practice, theory and education.

The LUMAT project addresses this challenge by implementation of new approaches, methods and instruments and new understanding of integrated environmental management in relation to sustainable land use. The LUMAT partnership of cities and regions, environmental agencies and research institutions have developed integrated “Common Functional Urban Areas Integrated Environmental Management Strategy (FUAIEWS)”, with shared transnational territorial and scientific competence. FUAIEWS includes strategies, supported by the concept of eco-system services, innovative technology and citizen participation. Pilot projects have been implemented based on elaboration of agreed action plans, with involvement by local stakeholders, using new interactive information tools for the management of urban/peri-urban management in

FUAs. Action plans also include financial instruments and management structures for their implementation. In two FUA cases (Poland, Slovakia) there have also been pilot investment projects that are under construction, funded from the LUMAT project.

The other aspect of the LUMAT project has been educational in order to enhance a common understanding of spatial relationships and coherence of FUA space. Part of the project activities consisted of trainings on the main topics of the project (FUA identity, eco-system services, citizen participation, reduction of land-use conflicts), first organised within the partnership during the meetings and after clarification of the country-specific issues in the partner countries, trainings have been for professionals and decision-makers in the field of integrated environmental management and land use planning in order to transfer the know-how developed in the LUMAT project.

The form of all LUMAT project proposals is focused on optimising spatial structures, on balancing negative effects of regional disparities and at the same time on preserving ecological and cultural diversity. The effort of presented LUMAT project team work has been to contribute towards integrated approaches to sustainable development and to the processes of economic, environmental, social and cultural transformation, emphasizing the integration of landscape-ecological, economic, social and technological aspects in sustainable land use in the FUAs in Europe.

I strongly believe this issue of TERRA SPECTRA Planning Studies will be interesting reading and motivation to deeper understanding of spatial development policy, based on the principles integrated environmental management.

**Dr. Anna Starzewska-Sikorska**

*Guest Editor, Leader of the LUMAT project*



Maroš Finka, Vladimír Ondrejčíka, Lubomír Jamečný,  
Zuzana Ladzińska, Micaela Scacchi and other LUMAT project partners

## COMMON FUNCTIONAL URBAN AREAS INTEGRATED ENVIRONMENTAL MANAGEMENT STRATEGY (FUAIEMS)

### Abstract:

The LUMAT concept of a common strategy for integrated FUA development management including the urban/peri-urban relationship in FUAs with the focus on the component of land and soil management creates a framework for the development of locally based strategies in the respective FUAs in the project LUMAT partners' countries. In the core of the concept for common integrated functional areas strategy, management creates optimized integrative land-use management and management of cooperation (including proper institutional framework) of the city core and its suburban areas seems to be the core instrument to face the threats in current urban/peri-urban development. As conceptual basis of sustainable integrative FUA's development management process in the LUMAT project is seen the concept of eco-system services to express the benefits from eco-systems for human wellbeing by economic means it offers a common denominator for the harmonization of different interests in the urban/peri-urban areas and threats based on the dichotomy between core and periphery as well as seeming dichotomy between economic and social on one hand and environmental development on the other hand. The LUMAT concept is based on Integrated urban development in the functional urban areas (FUAs) as a tool for optimization of land-use and soil management and its synergy with the concept of ecosystem services as well as management of cooperation of the city core and its suburban areas, including institutional framework. As a leading managerial concept, the concept of multilevel polycentric governance was chosen as a core concept for efficient institutional framework in the field of sustainable land use and soil management.

### Key words:

*common strategy for integrated FUA development management, urban/peri-urban relationship in FUAs, eco-system services, management of cooperation of the city core and its suburban areas, multilevel polycentric governance*

Common functional urban areas integrated environmental management strategy (FUAIEMS) has been created for common understanding and methodology frameworks for the development of strategies, plans and instruments of comprehensive management dedicated to sustainable development and environment embedded into the integrative land management in FUAs

The conceptual approach is based on:

- Integrated urban development in the functional urban areas (FUAs) as a tool for optimization of land-use management and its synergy with the concept of ecosystem services as well as management of cooperation of the city core and its suburban areas including institutional framework and
- Potential of multilevel polycentric governance as a core concept for efficient institutional framework in the field of land use and soil management. As a result of the knowledge gained and on the partners' experience the common strategy has been developed of integrated FUAs management. The aim was to help to elaborate specific documents addressed to various types of urban and peri-urban relationships.

LUMAT extends the area of study to the functional urban area level and to the development of strategies and tools made for transnational use:

- **PLANNING:** European Standard for Land Information and Balances in regional plans (CEN-Agreement); Evaluation tools for land portfolios, calculating follow-up cost in strategic development plans;
- **MANAGEMENT MODEL:** creation of land agencies, revolving financing model, impact compensation model. This document represents a transnational concept of a common strategy for integrated management of FUA development including the urban/peri-urban relationship in FUAs in the component of land and soil. It is as a result of training and identification and prioritization of common problems.

### Background of the concept

Today's urban agglomerations are exposed to rapid urban growth, leading to increasingly complex and unsustainable environments, which impact human health, well-being and ecological quality (UN-HABITAT, 2009).



Cities and human settlements face unprecedented threats from unsustainable consumption and production patterns, loss of biodiversity, pressure on ecosystems, pollution, and natural and man-made disasters, and climate change and its related risks, undermining the efforts to end poverty in all its forms and dimensions and to achieve sustainable development. Given cities' demographic trends and their central role in the global economy in the mitigation and adaptation efforts related to climate change and in the use of resources and ecosystems, the way they are planned, financed, developed, built, governed, and managed has a direct impact on sustainability and resilience well beyond the urban boundaries. (New Urban agenda, UN-HABITAT, 2016)

Although the FUAs as defined by the EC and OECD have not found broader positive response being defined based on very formal normative concept not reflecting the complexity of urban/peri-urban interrelations and not able to address real problems of environmental management including the land and soil management and the treats between different demands on use of resources the space incl.

From the point of view of environmental management the urban/peri-urban interface has several implications for its analytical part as well as for planning and policy interventions:

- The carrying capacity of the territory (soil productivity, vulnerability to floods, availability of drinking water, etc.) needs to be mirrored by a set of more appropriate criteria for the environmental assessment of the peri-urban interface than the conventional zoning criteria based on density, morphology and urban and rural uses of the territory.
- Conventional urban planning has favoured a centrifugal view inadequate for addressing the characteristics of the interface's "patchwork" structure. Through trade and natural flows of ecological goods and services, cities tend to draw on the material resources and ecological productivity of vast hinterlands.
- The expansion of cities' ecological footprints has important implications for the peri-urban interface in terms of both increasing pressures on its carrying capacity and missing production opportunities, for instance when food is imported from distant regions rather than supplied from the city's hinterland.
- From a socioeconomic viewpoint, uneven process of urbanization taking place in these areas is generally accompanied by land speculation, shifting economic activities of higher productivity, intensive use of agro-chemicals and fertilizers, mining or quarrying activities for the supply of building materials, social groups are heterogeneous and in constant transition. That is to say, the composition and interests of these

groups tend to change over time, in a process characterized by the fluctuating incorporation of new stakeholders. As a result, it is difficult to establish clear and more or less permanent institutional arrangements that deal effectively with the long-term management of natural resources and the enhancement of the livelihoods of those living and working in the peri-urban interface. This point is discussed in more detail below.

- The peri-urban interface is often characterized as the converging of sectorial and overlapping institutions with different spatial and physical remits. This is related to the changing geographical location of the peri-urban interface or of the process whereby institutional arrangements or areas of responsibility tend to be too small or too large, too urban or too rural in their orientation to address sustainability and poverty concerns effectively.
- Private sector bodies as well as non-governmental and community-based organizations also intervene in the management of peri-urban areas, but often without clear articulation or leadership from government structures. The problem of institutional fragmentation is particularly relevant for understanding the constraints faced in environmental planning and management within this interface.
- Peri-urban areas often share the territory of more than one administrative unit. Weak links and limited municipal power in sectors such as transport, water, energy, solid and liquid waste management, and land-use planning often result in uncertainty as to which institution administers which specific area or activity. No district is able to apply a single isolated approach when supplying the comprehensive water and energy flows required by its population, or to manage the wastes and pollution generated by that population within its jurisdictional limits. This discussion implies that environmental planning and management of this interface demands a conceptual and methodological shift from the physical definition of urban and rural areas (understood as clearly limited geographic and administrative entities) to a broader understanding, whereby the complex patterns of settlement and resource use, the flow of natural resources, of capital, goods, services and people, do not fit or accord with jurisdictional boundaries.

### **New Urban Agenda**

The most recent political responses are represented by New Urban Agenda adopted in Quito in the autumn 2016 (New Urban Agenda, UN-HABITAT, 2016):



- To use the capacities of the cities fulfilling their territorial functions across administrative boundaries, and act as hubs and drivers for balanced sustainable and integrated urban and territorial development at all levels (New Urban agenda, UN-HABITAT, 2016).
- To support territorial systems that integrate urban and rural functions promoting sustainable management and use of natural resources and land, ensuring reliable supply and value chains that connect urban and rural supply and demand to foster equitable regional development across the urban-rural continuum and fill the social, economic, and territorial gaps
- To promote the development of urban spatial frameworks, including urban planning and design instruments that support sustainable management and use of natural resources and land, appropriate compactness and density, polycentrism, and mixed uses, through infill or planned urban extension strategies as applicable, to trigger economies of scale and agglomeration, strengthen food system planning, enhance resource efficiency, urban resilience, and environmental sustainability.
- To develop spatial development strategies that take into account, as appropriate, the need to guide urban extension prioritizing urban renewal by planning for the provision of accessible and well-connected infrastructure and services, sustainable population densities, and compact design and integration of new neighbourhoods in the urban fabric, preventing urban sprawl and marginalization.
- To facilitate the sustainable management of natural resources in cities and human settlements in a manner that protects and improves the urban ecosystem and environmental services, reduces greenhouse gas emissions and air pollution, and promotes disaster risk reduction and management, through supporting the development of disaster risk reduction strategies and periodical assessments of disaster risk caused by natural and man-made hazards, including standards for risk levels, while fostering sustainable economic development and all persons' well-being and quality of life, through environmentally sound urban and territorial planning, infrastructure, and basic services.
- To adopt a smart city approach, which makes use of opportunities from digitalization, clean energy and technologies, as well as innovative transport technologies, thus providing options for inhabitants to make more environmentally friendly choices and boost sustainable economic growth and enabling cities to improve their service delivery.
- To create and maintain of well-connected and well-distributed networks of open, multi-purpose, safe, inclusive, accessible, green, and quality public spaces to improve the resilience of cities to disasters and climate change, reducing flood and drought risks and heat waves, improving food security and nutrition, physical and mental health, household and ambient air quality, reducing noise, and promoting attractive and liveable cities and human settlements and urban landscapes, prioritizing the conservation of endemic species.
- To preserve and promote the ecological and social function of land and foster ecosystem-based solutions to ensure sustainable consumption and production patterns; so that the ecosystem's regenerative capacity is not exceeded. We also commit to promote sustainable land use, combining urban extensions with adequate densities and compactness preventing and containing urban sprawl, as well as preventing unnecessary land use change and the loss of productive land and fragile and important ecosystems.
- To launch sustainable management of resources — including land, water (oceans, seas, and freshwater), energy, materials, forests, and food, with particular attention to the environmentally sound management and minimization of all waste, hazardous chemicals, including air and short-lived climate pollutants, greenhouse gases, and noise — in a way that considers urban-rural linkages and functional supply and value chains vis-à-vis environmental impact and sustainability, and strives to transition to a circular economy, while facilitating ecosystem conservation, regeneration, restoration and resilience in the face of new and emerging challenges.
- To implement long-term urban and territorial planning processes and spatial development practices that incorporate integrated water resources planning and management, considering the urban-rural continuum at the local and territorial scales, and including the participation of relevant stakeholders and communities.
- To implement environmentally sound waste management and to substantially reduce waste generation by reducing, re-using, and recycling (3Rs) of waste, minimizing landfills, and converting waste to energy when waste cannot be recycled or when it delivers the best environmental outcome. We further commit to reduce marine pollution through improved waste and waste water management in coastal areas.
- To develop sustainable, renewable, and affordable energy, energy-efficient buildings and construction modes, and to promote energy



conservation and efficiency, which are essential to enable the reduction of greenhouse gas and black carbon emissions, ensure sustainable consumption and production patterns, and help to create new decent jobs, improve public health, and reduce the costs of energy supply.

- To strengthen the resilience of cities and human settlements, including through the development of quality infrastructure and spatial planning by adopting and implementing integrated, age- and gender-responsive policies and plans and ecosystem-based approaches
- To develop the infrastructure that is resilient, resource-efficient, and which will reduce the risks and the impact of disasters, including the rehabilitation and upgrading of slums and informal settlements.
- To shift from reactive to more proactive risk-based, all-hazards and all-of-society approaches, such as raising public awareness of the risk and promoting ex-ante investments to prevent risks and build resilience, while also ensuring timely and effective local responses, to address the immediate needs of inhabitants affected by natural and man-made disasters, and conflicts. This should include the integration of the "Build Back Better" principles in the post-disaster recovery process to integrate resilience-building, environmental and spatial measures, and the lessons from past disasters and new risks into future planning.
- To promote climate action, including climate change adaptation and mitigation, and to support cities and human settlements, their inhabitants and all local stakeholders to be important implementers.
- To support the medium- to long-term adaptation planning process, as well as city-level climate vulnerability and impact assessments to inform adaptation plans, policies, programmes, and actions that build resilience of urban inhabitants, including through the use of ecosystem-based adaptation.
- To implement sustainable urban and territorial planning, including city-region and metropolitan plans, to encourage synergies and interactions among urban areas of all sizes, and their peri-urban, and rural surroundings, including those that are cross-border, and support the development of sustainable regional infrastructure projects that stimulate sustainable economic productivity, promoting equitable growth of regions across the urban-rural continuum. In this regard we will promote urban-rural partnerships and inter-municipal cooperation mechanisms based on functional territories and urban areas as effective

instruments to perform municipal and metropolitan administrative tasks, deliver public services, and promote both local and regional development.

- To prioritize renewal, regeneration, and retrofitting of urban areas, as appropriate, including upgrading of slums and informal settlements, providing high-quality buildings and public spaces, promoting integrated and participatory approaches involving all relevant stakeholders and inhabitants, avoiding spatial and socio-economic segregation and gentrification, while preserving cultural heritage and preventing and containing urban sprawl.
- To integrate urban and territorial planning based on the principles of equitable, efficient, and sustainable use of land and natural resources, compactness, polycentrism, appropriate density and connectivity, multiple use of space, as well as mixed social and economic uses in the built-up areas, to prevent urban sprawl, to reduce mobility challenges and needs and service delivery costs per capita, and to harness density and economies of scale and agglomeration, as appropriate.

### **FUAs as Natural Functional Spatial Units and Objects of Integrated Management**

Inevitable reflection of the complexity of urban/peri-urban interrelations and need to address real problems of environmental management including the land and soil management and the treats between different demands on use of resources (the land incl.) overstepping the borders of the cities in their administrative borders creates the background for the development of the concepts of common management of spatial development. This concept addresses the space of the core cities and their peri-urban areas to which the complex activities of the city life radiates crating intensive functional ties.

The LUMAT Project focuses on the development of the concept for the management of sustainable spatial development with the stress on cohesion of environmental, social and economic aspects as integrative comprehensive model of multilevel governance for the core cities and their peri-urban spaces crating functional urban areas. The basic theoretical concept of functional areas is defined on the principles of real functional ties between urban core area and its gravitation area represents the model of peri-urban interface.

This mirrors the fact, that there is growing recognition among professionals and institutions that rural and urban features tend increasingly to co-exist within cities and beyond their formal administrative boarders. Using already broadly known terminology the LUMAT project reflects the concept of FUAs as defined jointly by the OECD and European Commission (The methodology for the identification of the FUAs based on this definition was approved by the OECD Working Party on Territorial



Indicators in 2011 and consequently applied to 29 OECD countries). The FUAs in accordance with this definition represent “functional economic units” choosing as building blocks for the functional urban areas smallest administrative units for which national commuting data are available (LAU2 in Eurostat terminology).

Each functional urban area in the definition of the OECD and EC is understood as an economic unit characterised by densely inhabited “city core” and “commuting zone” whose labour market is highly integrated with the cores. The geographic building blocks to define urban areas are the municipalities (e.g. LAU2 in European countries). The city cores are defined using the population grid from the global dataset Landscan, referred to approx. year 2000 (Census year). Polycentric cores and the hinterlands of the functional areas are identified on the basis of commuting data (travel from home-to-work) referred to approx. year 2000. The definition of functional urban areas made by OECD and EC uses population density to identify urban cores and travel-to-work flows to identify the hinterlands whose labour market is highly integrated with the cores. The methodology consists of three main steps: identification of core municipalities through gridded population data, connecting non-contiguous cores belonging to the same functional urban area and identification of the urban hinterlands. The methodology makes possible to compare functional urban areas of similar size across countries.

As the analyses under the previous activities have shown, the definition by the OECD and EC and identification based on this definition in many countries does not reflect reality of the organisation of polycentric settlement structure as they are based only on limited criteria not mirroring real centrifugal interrelationships between core city and its functional area. This shows in addition to other facts the list of functional urban areas taking into account the results of the consultation with the European National Statistical Institutes launched by Eurostat in June 2011 on the definition of cities.

Although this list of functional urban areas should be reviewed on the basis of additional comments provided by countries, the difference between real urban functional areas and areas defined by the OECD and EC shows too big gaps, which cannot be covered by simple corrections, especially if the Functional Urban Areas, as labour market basins, are perceived as the key drivers of European, national, regional and local economic performance and important territorial structures in delivering on the Europe 2020 targets.

The concept for common functional urban areas management in the project LUMAT is based on innovative approaches in the planning systems including multilevel polycentric governance reflecting the fact, that the urban–rural dichotomy deeply ingrained in current planning systems is inadequate for dealing with processes of environmental and developmental change in the peri-urban context and the fact, that there are already proper models in Europe offering suitable institutional

environment for introduction and optimisation of integrative management in urban–peri-urban areas.

Europe is characterised by a polycentric network in which the FUAs as defined by the OECD and EC are only part of its structure. Reflecting the diversity and density of the European urban system, different size of the core cities and urban areas and broader scale of functions the FUAs in majority of the EU member states have not become the real instrument of the national spatial development strategies, although often used as the framework for the definition of the target areas for the investments from the European Structural and Investment Funds in the programming period 2014/2020. Functional urban areas defined based on proper definition and used as the instrument for spatial development management can be important territorial assets for Europe because they can frame for integrated approaches in the cities and their suburbs representing critical mass for development, strengthening urban–rural linkages and encouraging cooperation between cities belonging to a cross-border area, macro-region or even a global integration zone.

Inherent part of the development of the common integrative management model and strategy is to look for the roots of spatial integration. These roots are represented by FUA identity. That because one of important tasks of the LUMAT project was mapping different approaches and development of an integrative approach to the identification of FUA identity with the goal to frame the development and implementation of joint FUA development management including the strategy.

The LUMAT concept of common FUAs management is based on the concept of functional urban areas as the functional territorial units defined based on analyses of natural ties of interdependences and collaboration between core city and municipalities in the peri-urban areas institutionalised or based on national policies implementation (including adopting the OECD methodology) (top-down approach) or based on collaboration agreements framing, in addition to horizontal cooperation between core city (core cities) and municipalities in the peri-urban area, practical implementation of multilevel governance principle in the decision making (e.g. re-division of responsibilities based on efficiency and optimisation of problem solving level).

### **Procedural Building Blocks of Common Integrative Functional Urban Areas Development Management**

The joint concept of common functional urban areas management builds on project cycle creating the core of integrative environmental management process framed by 5 guiding principles:

1. The main feature of common FUAs management is its strategic character. It means the complexity of the process starting with diagnosis, via visioning, prospecting – planning and



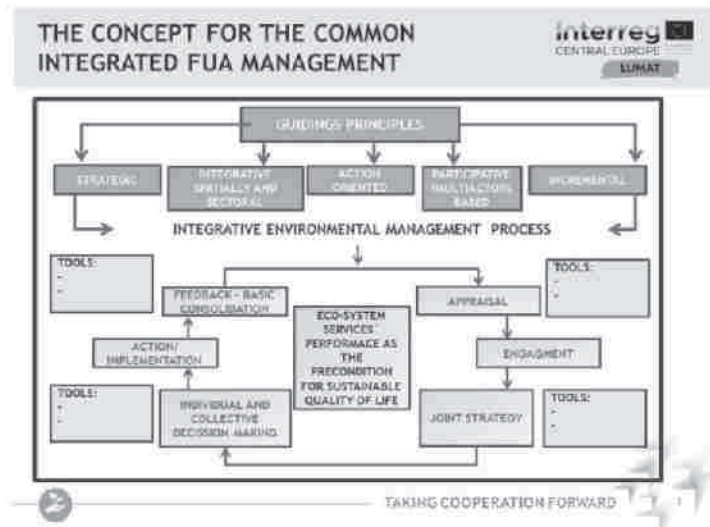


Figure 1: Concept for Common Integrated FUA Management.  
(Finka, M., 2017)

1. programming and ending with implementing and monitoring.
2. The common FUAs management is the platform for integration of different interests, aspects, potentials, limits in the space/territory of the FUAs across different hierarchical territorial levels, sectors of policies, stakeholders.
3. The common FUAs management is action oriented, it means the outputs from the planning, decision making and executing processes are the real improvements in the FUAs as the effects from managerial interventions across different levels of decision making, different target systems (ecosystems, infrastructural systems, social and economic systems) and different subjects involved.
4. The basic principle of the common FUAs management is the broad involvement of all stakeholders in FUAs into the decision making and implementation activities reflecting their different capacities for this involvement and collaboration.
5. The common FUAs management follows the logic of gradual development with synergy effects between different interventions coordinated in the time and space. In the same time its architecture creates preconditions for flexible use and reacting to internal and external shocks understood as disturbances as well as the potentials for revolutionary improvements.

The core quality followed by the project cycle which creates the backbone of the common integrated FUA management is the quality of life in the FUAs with the special focus on eco-system services as the precondition for sustainability of the quality of life. The project cycle includes the appraisal phase with the identification of the problems, their system ties, causalities and synergies, the

hierarchy, spatial extend and affection of different stakeholders.

This phase is followed by the phase of engagement focused on identification and addressing the stakeholders relevant for respective issue being it a problem or a challenge. Important is to analyse natural and institutional responsibilities, capacities (decision making, implementation) as well as capacities for collaboration and based on this to identify the most proper hierarchical level for the development of the strategy, decision making, strategy implementation, actions in the harmony with the concept of polycentric multilevel governance.

The development of strategy is understood as the participatory process involving the stakeholder following their individual engagement and capacity. The strategy development follows the logic of Goal Oriented Strategic Collaborative Planning (GOSCOP) starting with the diagnosis, continuing with the visioning, planning, programming and continuing into the implementation. The GOSCOP is the concept framing common methodology of specific integrated FUA plans. The process of strategy development is closely interconnected with the individual and collective decision making. The required quality of the decision making independently from the character of it depends on availability/accessibility of proper information, involvement of relevant stakeholders and their capacities. In this context the inherent part of the common integrated FUAs management is the process of building up the capacities of stakeholders for active participation in its execution.

The involvement of different stakeholders into the decision making is the precondition for their active participation in the implementation phase. The model of common integrated FUAs management is based on sharing the responsibilities not only in the phase of decision making but first of all in the phase of implementation activating individual financial, human, organisational and institutional capacities of respective stakeholders.



The project cycle is an iterative process in which important role plays permanent monitoring and feedback allowing in the combination with flexibility of strategies reflecting directly the success assessment in which perceived quality by the public plays important role in addition to objective indicators of the progress. The basic consolidation phase can be understood as the process of permanent adjustment of the strategy to changing external preconditions as well as reflecting the feedback from the monitoring of the progress of the implementation of the strategy.

### Topical/Substantial Architecture of Common Integrative Functional Urban Areas' Development Management

The object (target for the managerial interventions) of LUMAT common FUAs integrated management are the development processes in the FUAs referring to the actions that seek to improve human well-being. Development is not identical with the quantitative growth, but mainly connected with the improvement of the quality of life in the FUAs. Development goals are relevant to all parties. Development encompasses social, economic, and environmental changes (innovations, degradation, growth, decline...) in intensive mutual interdependences.

That because the core principle of the LUMAT concept for common FUAs management is the integration. The quality of life in the FUAs and quality of urban environment as the precondition for the quality of life of FUAs' citizens are synergic qualities to huge extend perceived subjectively. The integration in the common FUAs management includes different levels and different dimension. The levels are first of all represented by the hierarchy of territorial subjects from local/municipal via supra local, micro-regional (sub-regional), regional up to national and European.

There are substantial and procedural dimensions of the integration in the common functional urban areas management.

The substantial integration is based on contextual understanding of particular problems and challenges for the strategy development, decision making and implementation as well as the integration of different aspects, factors, views, policies (sectorial approaches). This integration has got different levels of integration as well understood as levels of abstraction or level of aggregation.

The procedural dimension of integration is based on integration of different particular processes in order to achieve complexity and in the same time efficiency of them (e.g. multi-actors decision making and participatory process of strategic environmental assessment) measures based on the comparison of the outputs/effects/improvements and inputs/used resources. The common

FUA integrated management includes the parallel and serial procedural integration.

Parallel procedural integration is focused on coordination, harmonisation of the parallel processes in the FUAs looking for their independences, contradictions, synergies... (e.g. the changes of the quality of public spaces in the core areas, the development of transport infrastructure and the processes of urban sprawl).

The sense of serial procedural integration is the optimisation of interlinks between the actions in their logic time sequence. The main time axe is determined by the flow of activities starting with the diagnosis with identification of potentials, problems and challenges via visioning, planning, programming up to the implementation. Serial procedural integration safeguards the coherence between the prospective activities represented by the complex of FUA integrative planning and executive activities represented by own development activities (among them implementation activities of plans and programs) and their management - executive management.

Planning is understood as basic management function involving formulation of plans to achieve optimum balance of needs or demands with the available resources. The planning process identifies the goals or objectives to be achieved, formulates strategies to achieve them, arranges or creates the means required, and implements, directs, and monitors all steps in their proper sequence.

The executive management focuses on efficient implementation of planed interventions (e.g. investments, regulations, subsidies...) and harmonisation of various activities driven by different stakeholders of FUA development. The main reference quality for executive management are the goals defined by the strategy of FUA development aimed on achievement improvement of the quality of life and its sustainability.

The topical/substantial architecture of the common integrated FUAs management can be visualised as follows:

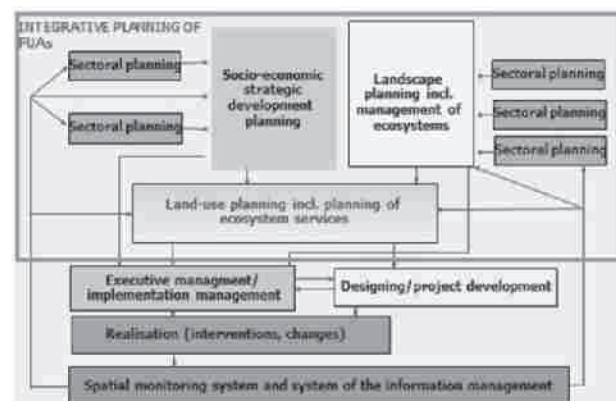


Figure 2: Integrative Planning and Management of FUAs  
(Finka, M., 2017)

Common FUA development management integrating the planning for core urban area and peri-urban areas cannot simply be based on the extrapolation of planning



approaches and tools applied parallel in rural and urban areas. In this concept it is based on the construction of an approach that responds to the specific environment, social, economic and institutional aspects of the peri-urban interface. (e.g. on processes of private appropriation of land, real-estate speculation, unequal conditions of environmental quality, areas subjected to environmental hazards often becoming the habitat of lower-income groups, whilst those areas of high environmental quality constitute the epicentre of speculative mechanisms, subtracting or "freezing" access for productive activities by previous dwellers or cancelling valuable ecological functions performed by natural systems).

In the core of the concept for common integrated functional areas management creates optimized integrative land-use management and management of cooperation (including proper institutional framework) of the city core and its suburban areas seems to be the core instrument to face the threats in current urban/peri-urban development.

### Ecosystem Services as Conceptual Basis of Sustainable Integrative FUA Development Management Process

The concept of ecosystem services is seen by the LUMAT project as the conceptual basis for integrated environmental management including the land and soil management. As an attempt to express the benefits from eco-systems for human wellbeing by economic means it offers a common denominator for the harmonization of different interests in the urban/peri-urban areas and threats based on the dichotomy between core and periphery as well as seeming dichotomy between economic and social on one hand and environmental development on the other hand. In the past, environmental dimension in the decision making in spatial development management was represented by issues as mitigating the impact of development activities or establishing areas to protect wildlife and cultural landscape.

Ecosystems are rather complex dynamic functional units consisting of all plants and animals (biodiversity) in an area, together with the non-living, physical components of the environment (water, soil and air) with which they interact. The cities and FUAs represent the socio-ecosystems as they include ecosystem and man as a social being.

ECOSYSTEM SERVICES are the services provided by the natural environment which benefit people addressing their well-being, satisfying their needs existential security, social and economic prosperity.

The confrontation of the demand represented by the needs and offer represented by the availability of services and their ability to satisfy the needs represents the value of services

We need to consider not only mitigation and protection although within a broader approach, but the fact, that the

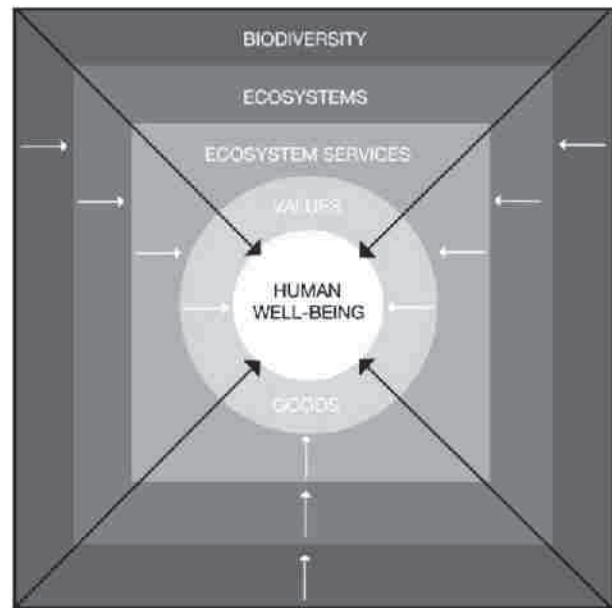


Figure 3: Biodiversity, Ecosystems, Ecosystem services and Human Well-Being  
(Finka, M., 2018)

people in their daily lives depend on a range of services that ecosystems provide and our role is not only to protect but to develop them in parallel. These services are fundamental to attaining quality of life of the citizens as main integrative development goal. There is no single way to implement an Ecosystem Services Approach.

FUAs represent very complex, dynamic socio-ecological systems of biophysical and social factors defined at several spatial, temporal and organizational hierarchically linked scales. The biophysical factors are represented by ecosystems as rather complex dynamic functional units consisting of all plants and animals (biodiversity) in an area, together with the non-living, physical components of the environment (water, soil and air) with which they interact. The ecosystems are significant with different levels of self-organisational and adaptive abilities. The social factors are represented by social units consisting of citizens, visitors, local economy players, and other subjects of social life in the FUA, their mutual interactions as well as interactions with the subjects of society they are imbedded in.

The main task of the FUA development management is to safeguard that they regularly interact in a resilient, sustainable manner, especially in the context of the presence of critical resources whose flow and use is regulated in the interaction between natural and societal processes.

This concept of the cities and their peri-urban areas as socio-ecological systems is crucial in the integrated concept of FUAs sustainable development management as it stress the fact that the delineation between social systems and ecological systems is artificial and arbitrary, as they are linked through multi feedback mechanisms and that both display resilience and complexity.



The most comprehensive theoretical background is created by Elinor Ostrom's social-ecological systems framework, within which much of the still-evolving theory of common-pool resources and collective self-governance is located. It also draws heavily on systems ecology and complexity theory incorporating ideas from theories relating to the study of sustainability, vulnerability, resilience and robustness, which makes this theoretical framework much more relevant for the common FUAs integrated development management in the context of challenges resulting from climate change and growing uncertainties in the development of FUAs among other reasons resulting from the growing role of multi-actors of FUAs development and their individual decisions.

For the LUMAT concept of the common FUAs integrated development management is important the conceptualized knowledge resulting from the research of the teams around Elinor Ostrom, that the management processes in such complex systems as cities and FUAs can be improved only by making them adaptive and flexible, able to deal with uncertainty and surprise, and by building capacity to adapt to change.

The object of the integrated FUA development management are the processes in both - social systems and eco-systems and especially their mutual interaction where the biggest challenge represents the question of harmonisation of different demands of different elements of social systems as well as eco-systems in the confrontation with the limitation of the available resources and preferences in the access to them and function of sustainability.

There is a whole scale of different conceptual frameworks for addressing this tasks of harmonisation of social systems and eco-systems development (e.g. circular economy), but the complexity of the tasks of integrated FUA development management is not in every time properly covered by them, as they mostly use to focus on particular human activities and are not fitting to the complexity of FUA functioning and development processes.

As proper interface between social aspects and ecological aspects of this harmonisation can be understood the concept of ecosystem services - services provided by the natural environment which benefit people. Understanding of ecosystem services is 'challenging the misconception that we must choose between the natural environment and economic growth' (Natural Environment White Paper Consultation, Sept. 2010)

The ecosystem services reach from providing the products satisfying basing needs of humans as biological elements - food, clean air, fuel, timber (provisioning ecosystem services) via creating proper framework for their existence by influencing climate, floods etc. (regulating ecosystem services), safeguarding sustainability of the processes framing the existence of humans - water cycling, soil formation (supporting ecosystem services) up to human needs at the top of Maslow's pyramid - aesthetic and cognitive inputs, health, recreation and tourism (cultural ecosystem services).

The confrontation of the demands represented by the needs and offer represented by the availability of services and their ability to satisfy the needs define the value of services. In regard to the common integrated FUA development management the most important questions using the concept of ecosystem services are as follows:

- how much an ecosystem contributes to the society and its economy?
- what are the benefits and costs of an intervention that alters the ecosystem (conservation, restoration, development project, regulation or incentive)
- how are costs and benefits of a change in ecosystem distributed and how to secure justice in this distribution?
- how to compare ecosystem goods and services with other imputes into economy and other societal processes (e.g. investments)
- how to internalise the ecosystem externalities of economic and non-economic activities
- how to balance the short and long term effects in economy and environment

One of the crucial connected questions for integrated FUAs' development management is the problem of multi-dimensional impacts of landscape fragmentation on ecosystem services which is one of main features especially in urban and peri-urban areas. At this scale one of the main challenges is how to optimise the allocation and management of different land uses and their sprawl and how to minimise the implications for ecosystem services.

In answering the questions above we have to be aware about the limits of the concepts of ecosystem services as it is not easy to put a cash value on nature. On the other hand the use of this concept can support wider understanding and rising awareness about the services provided by nature, their values and with this introduction of innovations in economic valuation addressing the value of ecosystem services.

The incorporation of the ecosystem services in the concept of integrated FUA development management allows to take the value of the natural environment into account in cost benefit analysis and to solve the problem of the imbalance between beneficiaries and losers.

Understanding the value of the natural environment enables:

- decisions on the land use that do not compromise benefits to society, business and the economy
- decisions on the land use able to balance real costs and benefits and secure the justness of their distribution
- improved delivery of services through better use of the land and linked natural environment
- reduced business risk and increased business opportunity



## Multilevel Polycentric Governance as Core Concept of Integrative Management of FUA Development

Integrative management of the FUA development has to be understood as a task of the system of territorial governance. Territorial governance is mainly understood as “the manner in which territories of a national state are administered and policies implemented with particular reference to the distribution of roles and responsibilities among the different levels of government (supranational, national and sub-national) and the underlying processes of negotiation and consensus building.” (COM, 2007)

The practice of European spatial development management is experiencing the movement from traditional model of hierarchical territorial government, connected closely to the very sensitive issue of territorial sovereignty across different levels of territorial units (local, regional), to the system of governance where power is shared and split between a variety of stakeholders creating overlapping vertical and horizontal co-operation patterns between governmental and non-governmental public and private structures across various levels of decision making. This natural process is driven by the development of new types of spatial structures not only overstepping the borders of administrative units like national states, counties or municipalities, but representing new qualities – increased permeability of territorial borders and openness for new spatial organization of human activities and the self-organizational mechanisms.

The FUAs belong to such spatial structures including the territory of several municipalities but only seldom creating institutionalised territorial unit with adequate governmental or self-governmental bodies. Such open systems allow high level of individual freedom (e.g. decision-making freedom, individual mobility), allowing and initiating not only changes in individual and collective behaviour and attitudes (e.g. new definition of belonging, territorial responsibility, shift from local to regional and global thinking, social control), but even the changes of territorial systems themselves.

The definition of “hard” borders and institutionalisation of the FUA as governmental or self-governmental territorial units would be even in the contrast with the nature of FUAs and processes there, as they are related to different, only partially overlapping spaces and it is no more possible to define exactly the borders of functional space of a city or of a region. The administrative borders lose its importance for spatial organization of citizens’ activities. Many people do not spend dominant part of their daily life in their home city; they use to commute for work, for leisure time activities, for services from municipality to municipality, from core city to peri-urban area and in opposite.

The question of their legitimacy to take part at the decision making in one, or in another municipality, or

region and of appropriate modes of governance in such opened multi centric territorial systems appears. We can speak about soft spaces and their fuzzy borders, about poly-centric governance, fuzzy and soft governance modes. Efficient use of territorial capital including the potential of ecosystems to provide eco-system services is closely connected with the cooperation of the territorial subjects and labour division in the FUA. For such cooperation the geographic proximity can play important role, but it is less and less dominant factor. As the spatial development practice shows, providing spatial linkages inside of a group of neighbouring cities is not necessarily leading to functional interdependencies. Fuzziness and softness as the significant features of FUA are very close but not identical qualities. Fuzziness of the space relates to the definition of belonging and un/certainty in it, can be defined as the feature of physical as well as social spaces. Softness of the spaces is the feature of social spaces, relates to the perceived quality of spatial framework for human activities and processes, to the development flexibility and openness for self- definition and self-organization processes. (Finka, 2001)

Reflection of this new reality in spatial organisation of human activities, including and determining economic processes, is one of the preconditions for strengthening the sustainability of spatial development in the FUAs facing increasing level of uncertainty, unexpected internal disturbances and external shocks the cities and their peri-urban areas have to face. The dominant approaches in current spatial development practice based on the development of the ‘hard’ infrastructure, such as efficient communication networks, protective dams, renewable energy production technologies etc. are not complementarily completed by adequate ‘soft’ infrastructure, including in particular an effective institutional framework allowing efficient realisation of governance processes, as an important prerequisite for developing and sustaining economically, socially and environmentally balanced settlements structures.

Morphologic and functional structures of FUAs in the combination with already traditionally implemented hierarchic multilevel governance seem to create optimal spatial framework for polycentric governance systems consisting of democratic units at different hierarchical levels that each exercise considerable independence to make and enforce rules within a circumscribed scope of authority for a specified territorial unit. In this system traditional territorial governance units – municipalities and self-governmental regions or state administrative regional units play the role of the general-purpose governments with clear territorial belonging, whereas the second layer may be represented by specialized decision making centres with much softer territorial ties but directly linked to the self-organisational management of specific resources (e.g. of ecosystems providing eco-system services), among them at the first place territory itself with its specific potentials. (e.g. soil, water, renewable energy resources...)



They may be organized in special softly defined territorial unit of FUA, as non-governmental organisations, networks or clusters with fuzzy character of their spatial/territorial definition. They may create parallel adaptive systems that are nested within ever-larger units at the regional and national level that are themselves parallel adaptive systems.

Such polycentric governance systems in the FUA as the combinations of external rules imposed by territorial authorities as well as self-governed informal rules in use open the space for considerable autonomy of particular decision making centres to experiment with diverse rules for using a particular type of resource system and with different response capabilities to external shocks. Higher resistance of the system as whole is based on flexibly acting smaller-scale soft governance units in polycentric system where the decision maker have got better access to local knowledge, rapid feedback from the implementation process of their decisions allowing them to learn from own experience and experience of parallel units.

The actors of FUA development participate on hierarchical territorial government system collaborating on strategic planning, participating o decision making and implementation of the policies. This means the shift from traditional, in many cases inflexible and not problem oriented schemes, to efficient framework of rules empowering relevant territorial governance actors to participate and to overtake responsibility for the decision making and in the same time to protect territorial sovereignty and subsidiarity as the guiding principles of decision making legitimacy but overstepping the limits of territorial belonging reflecting the reality of everyday living processes in the society and economy typical for knowledge based society.

The model for this shift seems to be the synergy of multilevel governance principles as declared in the Charter for Multilevel Governance in Europe (CEC, 2014) and polycentricism concept in the form of the multilevel polycentric governance.

The multilevel polycentric governance model creates the basis for

- inclusion and participation, broad participation of public and private actors (self-governmental bodies, NGO, firms, individuals, association) directly or through legitimate intermediate institutions, strengthening of collaborative decision-making
- subsidiary by decentralising most of the decisions concerning the particular issues to the decision-making level consistent with efficient and cost-effective delivery of outputs; non-hierarchical modes of guidance, such as persuasion and negotiation;
- acknowledgement of diversity, as crucial mean to improve well-being of FUA citizens.

- Accessibility and equity (equal access to the participation on decision making, to the services, work...)
- accountability/transparency of decision makers across different levels of territorial government involved, in the private sector and in the civil society organisations should be accountable to the public as well as to institutional stakeholders (publicizing planning and programmes, performances), etc.
- sustainability in all dimensions of FUA development
- efficiency and effectiveness, (in the delivery of public services, promoting FUA economic development, production that meet needs, while making the best use of resources)
- security and safety of individuals and their living environment (crime and conflict prevention and disaster preparedness), etc.
- diffusion of information and learning, self-learning, knowledge affordability (iterative process of monitoring and target readjustment, networks, etc.);
- diffusion of understanding of complexity of FUA development among decision makers - rising awareness about necessity of strategic thinking and long term perspective thinking
- comprehensive and innovative management;
- flexibility of strategies and tools and capacity of adjustment using soft tools;

Multi-level polycentric governance in the FUAs emphasize the dispersion of decision making from the local to the global level incl. "vertical" dimension referring to the linkages between higher and lower levels of governance and "horizontal" dimension referring to the arrangements of co-operation a participation at the decision making between different actors at the level of regions or municipalities. These agreements are increasingly common as a means by which to improve the effectiveness of local public service delivery and implementation of development strategies

Integrative sustainable management for urban/perl-urban areas – FUAs seems to be realistic only using the potential of the concept of multilevel polycentric governance as a core concept for efficient and effective institutional framework in the field of environmental and especially of land use management. The multilevel polycentric governance concept provides, by proper arrangement of the interrelations between different types government and governance, the frame for integrating conceptually the set of informal management instruments (planning, decision making, implementation - executive instruments - creation of land agencies, revolving financing



mods, impact compensation modes) with formal institutionalized (obligatory used e.g. land-use plans, regulatory decisions... ) and other instruments like European Standard for Land Information and Balances in regional plans (CEN-Agreement), evaluation tools for land portfolios, calculating follow-up cost in strategic development plans etc.

The joint model for integrated environmental management for urban/peri-urban areas – FUAs reflects the lack of institutions with a clear and specific remit on urban/peri-urban areas, it has to allow to integrate the policies and strategies that affect the urban/peri-urban areas from the broader perspective, considering the policies with more immediate impacts as well as those which affect a variety of flows between rural and urban areas. Integrative environmental management for urban/peri-urban areas aims on positive changes in rural–urban linkages that both enhance the use and state of natural resources and improve the livelihoods of citizens and subject of the local and regional economy.

The concept includes a focus on localized and discrete actions, reflection of the pressures and flows at the regional level as well as urban perspective of seeking the comprehensiveness of the development mirrored in the planning system and allied institutions. Integrative environmental management for the urban/peri-urban interface requires a combination of methods that strike a balance between local planning (paying particular attention to the heterogeneity of and power relations within peri-urban communities) and the broader dimension of regional planning.

The key features of the urban/peri-urban areas which are reflected in the content, approaches, tools as well as institutional arrangements of the integrative environmental management are as follows:

- the specific ecological nature of peri-urban systems;
- the heterogeneity and threats of diverse qualities (potentials and limits) and demands
- the vulnerability of peri-urban socio-ecosystem
- fuzzy character (the difficulty to identify the boundaries) of the area versus territorial governance systems.
- Multifunctional use of the area and variety of land use in rather fragmented urban and peri-urban landscape.

Integrative environmental management for urban/peri-urban areas has a strategic and in the same time executive nature creating a balance between the formulation of long-term, cross-sectorial and dynamic strategies and the development of short-term interventions.

The joint model of integrative management for urban/peri-urban areas developed in the frame of LUMAT is able to embed diversity of local, regional and national practice and legal environment understanding current

integrative and sectoral policies that affect directly and indirectly the development of urban/peri-urban areas. The object of integrative environmental management for urban/peri-urban areas are rural–urban linkages or flows (of goods, people, commodities, capital, information) which can be mutually reinforcing or truncated, leading to different trajectories and reciprocal or opposing relationships between urban and rural development.

Integrated environmental management for urban/peri-urban areas requires the engagement of a broad variety of actors, ranging from the local communities living and working in these areas to institutions operating at the sub-national and national levels. Treating urban, rural and natural ecosystems together increases the complexity of participatory strategies but builds new forms of collaborative arrangements that transcend the boundaries of urban and rural action. A strategic approach consists of identifying the specific institutions and actors affecting and being affected by different processes of change. This type of “issue-specific institutional arrangement” has been successfully adopted in the definition and implementation of urban environmental planning and management within the framework of Local Agenda 21.

Typically, this process starts with a broad consultation in which different actors and institutions are brought together to participate in a comprehensive environmental forum. This forum is the basis for setting broad-based consensus on issue-specific objectives and strategies. The different issues that are prioritized become the basis for establishing more specific institutional arrangements, usually in the form of a series of thematic working groups and a steering committee. Specific partnerships are established for the practical implementation of concrete actions.

Integrative development management for urban/peri-urban areas gradually tends to cover more issues and to involve more stakeholders. To be able to handle the growing complexity it is necessary to develop the model addressing an incremental process, which highlights the importance of working gradually at several levels (from the regional to local level and vice-versa), seeking their articulation at different stages of the process.

The common model for integrative development management for FUA does not mean unified strategies for FUA development. It is understood as a framing concept supporting the development of specific strategies reflecting specifics of respective FUA. That because important part of the model create criteria for selecting alternative strategies mirroring on one side the FUA specifics on the other side the joint values and goals resulting from the common understanding of priorities of the spatial development in the FUA as defined in the LUMAT project.

The dominant criteria are:



**1. Political viability**

- a. How high is the political potential to undertake a major activities?
- b. Does the public understand the problem, the goals and supporting actions to address it? c. What is the range of interests that would be affected?

**2. Legal authority and institutional capacity**

- a. Does the legal environment offering proper framework for adopting and carrying out the strategy in FUA's?
- b. Is there institutional capacity for adopting and carrying out the strategy
- c. If not a) and/or b) is there real potential to develop proper institutional capacities in time?
- d. Have got the decision maker adequate authority to carry out the strategy?
- e. Is there the potential or necessity to build a partnership with another government body that has authority?
- f. Does the strategy require coordinated or joint actions across scales and/or sectors, is there a mechanism to do so, or can one be created?

**3. Economic viability**

- a. Is the strategy cost-effective for society as a whole?
- b. Is the strategy efficient? Are there more efficient alternatives?
- c. How is the balance between different resources (with special focus on natural resources incl. land and soil) activated in the strategy, is their use sustainable?
- d. What are and how is the proportion between economic and non-economic benefits?

**4. Effectiveness**

- a. Is the development strategy based on actions that are capable of modifying the direct and indirect drivers of the FUA development and especially of the ecosystem change? If yes, what is the balance between positive and negative changes?
- b. Is it possible to set an incentive such as a tax credit at the appropriate level to change behaviour?
- c. Can the results of the implementation of the strategy be measured and used for accountability and to change course as appropriate

**5. Equity**

- a. How is the arrangement of the division of cost and benefits (not only financial, but environmental and social as well) – is there equal balance?

- b. Is the outcome fair to all stakeholders? Is the strategy based on fair processes of public participation incl. the decision making processes?
- c. If there are "losers" under the strategy implementation, how and where they will be compensated (with special attention to the ecosystem services)?

As the analyses, reported under the Deliverable T1.1., have shown, current challenges for the management for the FUA lack a well-institutionalized policy domain and is the situation is mainly characterized by only weakly defined responsibilities, procedures and routines. Therefore comprehensive, coordinated strategic approaches integrating different areas of expertise, developing a comprehensive approach across different levels and promoting bottom-up approaches are needed.

In addition there is the need to develop further innovative approaches and solutions able to address different aspects of the wicked problems of sustainable development of FUA's and especially in the field of ecosystem services management reflecting the problem perception and interests of the different actors involved in and necessary for problem solution.

Important part of the multilevel polycentric governance concept is the process of public participation involving all stakeholders into the processes of visioning, preparation of the plans and programs as well as their implementation. Stakeholder participation is a tool which enables local and regional stakeholders to get involved in the planning and delivery of innovative local solutions of FUA problems. Stakeholder engagement process provides stakeholders with an opportunity to state their opinions; it creates an opportunity for debate, empowers stakeholders in decision-making, and ensures that stakeholders have a sense of ownership in the decisions taken. To be engaged means an opportunity to get informed, to learn and to deliberate. In this approach, stakeholders communicate not only with decision-makers but also among each other.

According to Eurosite Management Planning Toolkit, the consensual/participative management planning approach can be achieved in different ways:

- consultation before drafting of the plan begins
- cooperative working during the whole drafting process
- consultation following various stages of plan production
- consultation on completed draft plans.

The integrative character of the FUA's development planning considers continuous consultation in various stages of management plan production to be the most appropriate since this approach also respects to the highest degree the requirements of the Aarhus Convention on Access to Information, Public Participation and Access to





Justice, and the Convention on Biodiversity where the management of land and water and living resources is seen as being a matter of societal choice.

Crucial aspect for the success of the engagement process is to inform and involve stakeholders in the early stage in order to build the commitment and trust for future actions. Stakeholders should be involved when all options are still open and engagement should continue throughout the planning process. If stakeholders are involved at a late stage of the process, or at the stage when the decisions have already been made, this can create a feeling of manipulation and increase distrust. In these cases it is better not to open the participation at all.

### Benefits and barriers of stakeholder engagement

The overall benefit of stakeholder participation in management planning is a better quality of a management plan. As stated in IUCN Guidelines for Management Planning in Protected Areas, the list of benefits includes the following:

- increased sense of ownership
- greater support for the protective measures
- links planning for conservation with planning for development
- provision of communication mechanism

Engagement of stakeholders brings knowledge about problems and needs into the planning process, it solicits the views of citizens on proposed options, allows the development of alternative solutions, and provides an opportunity for the public to discuss and understand complex issues. It enables better quality of decisions, and creates common basis for harmonised actions. It raises awareness about behavioural modes, helps to overcome conflicts and increases public support and social empowerment.

Stakeholder engagement also increases the legitimacy of the planning and decision-making process as it enables a dialogue and deliberation about the issues. It also enables stakeholder's feedback on the acceptability and usefulness of management actions. Engagement of stakeholders is a demanding process, often accompanied by barriers which are mainly related to weak capacities and skills for participation, difficulties in reaching consensus,

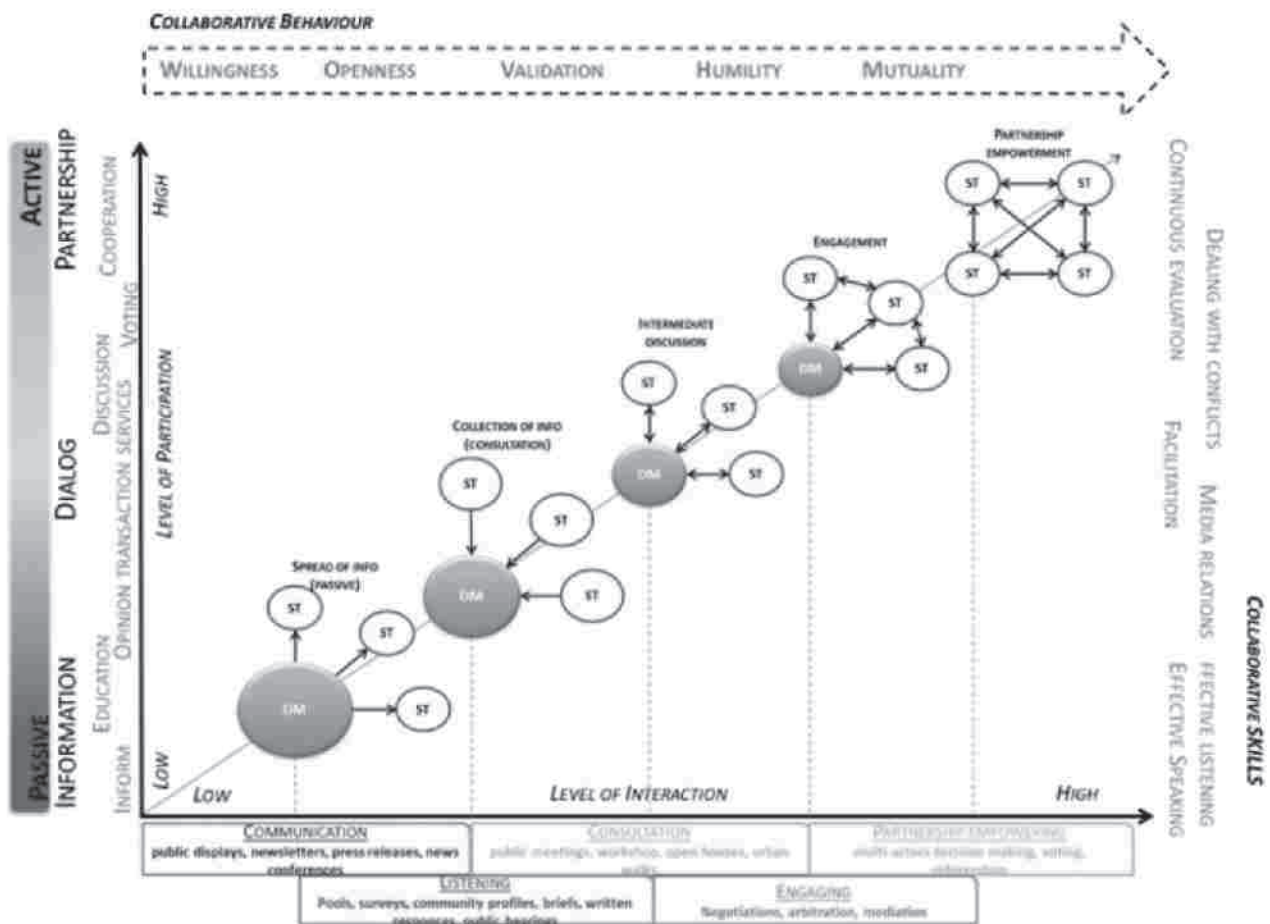


Figure 4: Phases/Levels of Stakeholders' Participation (Finka, M. et al., 2018)



prolongation of the planning process due to the engagement, and increased costs.

The following main principles are crucial for successful stakeholder engagement in accordance with the above mentioned guidelines:

- **Efficiency:** The efficiency principle requires clear and well-designed procedures as well as a stakeholder engagement plan for informing, consultation, and active participation of stakeholders in decision-making process.
- **Inclusiveness and transparency:** This principle requires an open and transparent engagement process and inclusion of a wide range of participants from the community with special focus on the proper selection of key stakeholders and tailored consultation processes.
- **Effectiveness:** The effectiveness principle requires that stakeholders' views are taken into account and have a real impact on plan or policy development and implementation. In cases when there is no clear genuine role for stakeholders to play or when it is not sure that they can influence decisions, the involvement is not reasonable and could bring negative effects.

The involvement of the stakeholders (public participation) has 5 main levels which can be interpreted as the steps in which the decision makers are engaging different stakeholders with different intensity and in different positions.

The initial phase of stakeholder involvement is mapping which provides the essential early information about the stakeholder of the FUA development. Each phase has its specifics which need to be taken into account by choosing approaches and tools of the stakeholders' involvement. The figure below shows the development of respective phases of the procedure and its internal logic and features of main 5 phases including the changing position (dominance) of decision makers (DM green) and other stakeholders from phase to phase.

## Conclusions

The LUMAT concept of a common strategy for integrated FUA development management including the urban/peri-urban relationship in FUAs with the focus on the component of land and soil management creates a framework for the development of locally based strategies in the respective FUAs in the project LUMAT partners' countries.

The conceptual approach is based on integrated urban development in the functional urban areas (FUAs) as a tool for optimization of land-use and soil management and its synergy with the concept of ecosystem services as well as management of cooperation of the city core and its suburban areas including institutional framework. As a leading managerial concept the concept of multilevel polycentric governance was chosen as a core concept for efficient institutional framework in the field of sustainable land use and soil management.

The LUMAT concept of a common strategy for integrated FUA development management works with functional urban areas as the functional territorial units defined based on analyses of natural ties of interdependences and collaboration between core city and municipalities in the peri-urban areas institutionalised or based on national policies implementation (including adopting the OECD methodology) (top-down approach) or based on collaboration agreements framing, in addition to horizontal cooperation between core city (core cities) and municipalities in the peri-urban area based on practical implementation of multilevel governance principle in the decision making (e.g. re-division of responsibilities based on efficiency and optimisation of problem solving level).

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## TRANSNATIONAL CONCEPT FOR ACTION PLANS IN FUAs

### Abstract:

The common transnational format of action plans defines the LUMAT approach to enhance the integrated environmental management of Functional Urban Areas (FUAs) in Central Europe. The experience and knowledge of the project partners in the strategy development and carrying out actions in 7 FUAs (Chorzów, Ruda Śląska and Swietochłowice in Poland, Trnava in the Slovak Republic, Ostrava in the Czech Republic, Leipzig in Germany, Kranj in Slovenia, Chierese Carmagnolese in Italy, Voigtsberg in Austria) is compiled into this document. The focus of the action plans is to make FUAs more liveable according to the needs and interests of the stakeholders present in each FUA. By looking beyond the municipal boundaries at the FUA level, the LUMAT partners have been able to identify new potentials for eco-system improvement as well as a wide range of stakeholders which are to be involved in making integrated environmental management and sustainable development a reality.

### Key words:

*action plan, Functional Urban Areas (FUAs), integrated environmental management*

### Action Plans for More Liveable Places in Functional Urban Areas

The common LUMAT goal in all FUA areas is to achieve sustainable development and more liveable places. However, making "more liveable places" is a goal that is constantly being pursued everyday by many people.

From the view of urban planners, new "more liveable places" are being created every day and all year long. Everything involved in the construction of new settlement areas is defined "more liveable" in terms of the priority given to new settlement and traffic areas all over Central Europe. These construction projects for "improvements" mostly take place in outer city zones and outside of the already existing settlement structure. According to the general public, "more liveable places" are places where they can live in newly built up outer zones and where they are able to realize their own satisfaction there, can realize their own desires of a "normal" and "successful" life. From the view of commercial developers, "more liveable places" are places where it is easily possible to use economic services in the outer urban zones and there is a highway within close reach and accessibility is performed. For decades these views have been the standard rule of living in growing FUAs with its urban and peri-urban components. We are people living in the FUAs of Central Europe. And we have our standards of life. And these standards are correlated with a type of consumption which is not sustainable.

### "CHANGE" the Standards of Development

The goal of LUMAT is to make places more liveable through implementing sustainable land use. For this, a new approach to management is necessary to reduce land consumption. More focus needs to be directed towards the areas in FUAs that have been ignored by others. LUMAT wants to address threatened areas that are vacant, left behind and forgotten. Threatened areas are to be mapped for FUAs, evaluated in their importance, and prioritized for future actions to take place there first. To be done are actions for revitalisation, environmental compensation and the improving of living conditions for FUA residents. By placing importance on threatened areas, LUMAT looks to make more liveable places in a manner different than that which has been historically pursued by others.

Brownfield sites are social, economic and environmental burdens upon the surrounding community. They hinder soil functions from performing, for example water retention or climate regulation, due to unnecessary soil sealing for an urban use which is no longer in need. The same applies to sprawling settlement structures, which cut into landscapes and consume natural and agricultural land resources with new infrastructure and streets.

These technical infrastructure can even become a financial threat upon communities, especially if they are shrinking in population and there are fewer people in the future to pay for their maintenance. The danger of flooding is raised when more land is consumed and made impermeable through construction activities. The deficiency of urban green in urban cores due to speculative building can create over warming and heat island affects

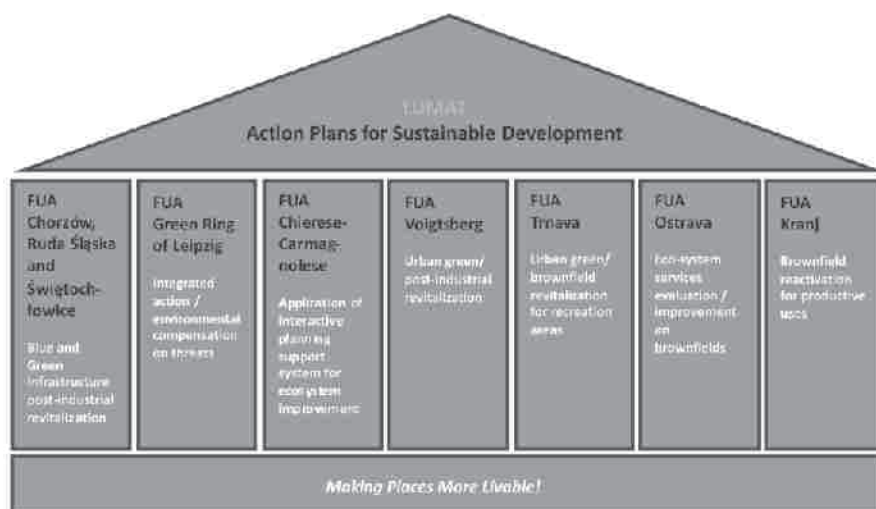


Figure 1: Common concept of action plans in the LUMAT project. (Siemer, B., 2017)

which can negatively affect the health of residents. There are many types of threats which have come to exist today.

Threatened sites, when properly revitalised, can provide vital eco-system services to areas most in need and also can remove a barrier to realizing improved living conditions. LUMAT wants to implement sustainable land use management that recognizes the potentials offered by threatened sites to realize more “more liveable places” in FUAs. For example, the development of a brownfield site into a green urban site is not only a speculated site development. It is also a development for the people living in the area and the FUA. It can improve the quality of eco-system services which residents can experience directly in front of their house door. Addressing threatened sites can directly improve the sustainability of land use and the unsustainable consumption of land.

### The LUMAT Action Plan Approach

The LUMAT approaches to making “more liveable places” in FUAs of Central Europe are manifold. The figure above summarizes the main aspects being pursued in each FUA area of the LUMAT project. Though the actions are specific to the FUA character of the partner regions, each and every one of the actions leads to the LUMAT goal of making “more liveable places” by addressing the threats that exist in the FUAs and the sustainable use of land resources. All LUMAT partners have identified the soil and land threats existing in their regions.

It can be seen that common threats which are present in the Central European FUA regions are: new soil sealing, brownfield sites, flooding hazard and contaminated sites. These are central themes of the LUMAT approach and define the action plan content. The evaluation of these threats and the potential for addressing them to make places more liveable will have to take place on a place by place basis since the means for evaluation vary according to the needs of political, economic, social and environmental aspects.

THREATS AND THREATENED SITES on Soil and Land in Partner FUA	Evaluation all LUMAT Partners	FUA Chiese-Carmagnolese (IT)	FUA Kranj (SI)	FUA Green Ring Leipzig (DE)	FUA Ostrava (CZ)	FUA Voigtsberg (AT)	FUA Chorzów, Ruda Śląska and Świętochłowice (PL)	FUA Trnava (SK)
Soil Sealing on Land	COMMON	X	X	X	X	X	X	X
Brownfield Sites	COMMON	X	X	X	X	X	X	X
High Water / Flood Hazard on Land	COMMON	X	X	X		X	X	
Contamination Sites	COMMON	X	X	X	X	X	X	X
Over-fertilisation Land	Medium	X	X	X				X
Overwarming Sites	Individual			X				X
Soil Erosion Land	Individual		X					X
Loss of Soil Biodiversity	Individual	X						
Air Pollution	Individual				X		X	
Soil Compaction	Individual							X
Loss of Organic Matter	Individual							X

Table 1: LUMAT Common Threats. (Siemer, B., 2017)



## Stakeholder Management

LUMAT is creating change in 7 FUAs through implementation. Important is the identification of who is responsible for implementing sustainable land management in the FUA. Sustainable land management is influenced by many different types of stakeholders: citizens, sectorial agencies, regional and local planners, scientist, etc. To deal with the wide range of interest present, an action plan must manage the interests of stakeholders for pursuing sustainable land management. In practice, this requires meetings and discussions with stakeholders to develop an action plan in a participative

manner. Once the stakeholder interests are managed and a vision is agreed upon, the responsibility to then to carry out the action plan ideas should be incorporated into existing administrative structures and organizational duties in the FUA. Stakeholder management widens the support for implementing an action plan. The following table details out the stakeholders which were involved in the drafting of the action plan content in the LUMAT pilot FUA regions and present an initial idea as to who can be involved in implementing sustainable land management.

FUA	Stakeholders Involved
FUA Voitsberg (AT)	<ul style="list-style-type: none"> <li>■ Mayors, heads of city administrations in the “Lipizzanerheimat” region</li> <li>■ Local mining company</li> <li>■ Cooperation within the regional project “Stadtregionales Flächenmanagement (SRFM)” (City-regional land management)</li> <li>■ Land owners and local enterprises</li> </ul>
FUA Ostrava (CZ)	<ul style="list-style-type: none"> <li>■ Multi-resort platform (including the Ministry of Industry, Ministry of Regional Development, Ministry of Agriculture, Ministry of Environment)</li> <li>■ General public</li> </ul>
FUA Green Ring of Leipzig (DE)	<ul style="list-style-type: none"> <li>■ Sectoral Agencies responsible for environmental management:                             <ul style="list-style-type: none"> <li>○ Saxon State Office for Environment, Agriculture and Geology (Departments for soil protection, State Flooding Center,</li> <li>○ Agency for Central Land Management Saxony</li> </ul> </li> <li>■ Mayors from 12 FUA communities, as represented by the Green Ring of Leipzig organization for inter-municipal cooperation</li> <li>■ City Administrative Departments                             <ul style="list-style-type: none"> <li>○ Department for Environmental Protection</li> <li>○ Department for Urban Green and Waterways</li> </ul> </li> <li>■ General public</li> </ul>
Chierese-Carnagnolese (IT)	<ul style="list-style-type: none"> <li>■ FUA Political Assembly 22 Mayors coordinated by the FUA “SpokeMayor”</li> <li>■ Committee &amp; Working Group (Technical of FUA Municip.) for the implementation of the integrated environmental management of the FUA</li> <li>■ Citizens and stakeholders</li> </ul>
FUA Chorzów, Ruda Śląska and Świętochłowice (PL)	<ul style="list-style-type: none"> <li>■ Representatives and the mayors of the three cities Świętochłowice Chorzów and Ruda Śląska in the FUA</li> </ul>
FUA Kranj (SI)	<ul style="list-style-type: none"> <li>■ Representatives and the mayors of the city of Kranj and its FUA</li> <li>■ Citizens and stakeholders</li> </ul>
FUA Trnava (SK)	<ul style="list-style-type: none"> <li>■ Representatives and mayors from 16 municipalities, as represented by the ZOMOT organization for inter-municipal cooperation in the FUA</li> </ul>

Table 2: LUMAT Stakeholder Management for Action Plan Drafting. (Siemar, B., 2017)



## Summaries of Action Plans in 7 Functional Urban Areas

Action plans should focus on the general and individual situation of FUAs and be developed regarding the common and specific circumstances. This includes the necessary background information, a description of the challenges to be addressed and establish the reason why a specific action has to take place. Having done this, a future orientation should be discussed in the document; the goals which are to be reached in the future and the concretization of these goals through objective setting should be presented. Actions and/or pilot projects should be agreed upon by stakeholders to reach sustainable land management.

Action plans with stakeholder involvement have been created in all of the LUMAT FUAs and these documents:

- support existing spatial planning policies and sustainable development goals in a region
- include interdisciplinary content,
- engage in stakeholder processes of elaboration,
- gather and organize scientific inputs on governance and ecosystem services, and detail the use of innovative decision support tools.

### Austria – FUA Voitsberg

Several individual meetings with mayors, heads of city administrations in the "Lipizzanerheimat" region, as well as with representative from local mining company have been held so far for the development of the action plan in the Austria LUMAT FUA. These meetings focused on the need to:

- harmonize the vision/mission of the action plan with the new planning strategy of the "Styrian Central Region" (2016-06)
- establish the ideas for the action plan together with the representatives of the municipalities
- develop the concrete actions

At the same time a close co-operation with a new implemented project by the region "Stadtrregionales Flächenmanagement (SRFM)" (City-regional land management) is running which is a condition of the mayors (Regional Development Association). In November 2017 two intensive workshops with land owners and local enterprises were organized to inform and discuss the LUMAT approach.

There are currently a variety of projects which are being discussed for the pilot actions in the region:

- A detailed plan for the further development of the municipality of Maria Lankowitz as a wedding site is being prepared. The first step will start with creating flower gardens.
- Preparation for the application to a Styrian funding program related to village renewal projects (Dorferneuerung).

- The use of geothermal energy for vegetable planting (greenhouses) on former mining areas in Rosental are being intensively discussed and solutions with the land owner (the mining company) are trying to be solved.
- An agreement between the region Lipizzanerheimat and the mining company for the whole region is to be prepared on the political level.
- The first contacts with local gardening firms have been organized and a second step will include inviting gardening firms from Graz and Vienna as well.
- With the municipality of Baernbach an eco-garden concept based on a non-profit approach is in discussion; the municipality is very interested to support this concept.

On the regional level, all the pilot gardens and parks within the pilot region LUMAT will be involved in the planning phase for the new conception of bike path within the 5 municipalities of the "Kernraumallianz". This will open up an important recreational area both for the region and for the Graz area.

### Czech Republic – FUA Ostrava

The Action Plan titled „Action Plan for integrated environmental management for Ostrava FUA“ for the Czech LUMAT pilot FUA will mainly facilitate the regeneration or re-use of brownfield sites. Specific targets include improving the possibility of temporary brownfields utilization as well as preventing new brownfields emergence through private and public sector support. At the same time, an increase in awareness of the extent of the potential risks arising from the existence of historically used sites will be aimed for.

By achieving the main objective of brownfield regeneration, the region will also concurrently pursue other partial goals:

- Improving the environment
- Reduction of loss of agricultural land
- Local reduction of air pollutant concentrations by increasing the share of green areas
- Reduction of potential hazards resulting from historic yet only partially acknowledged contamination of the soil
- Reintroduction of unused localities into functions of the municipalities/cities

The objectives of the Action Plan are manifold:

- Create legislation which encourages initiative to support brownfield regeneration
- Create an authorized "brownfield manager"
- Support for temporary use
- Mapping sites with potential contamination and prioritizing the solutions



- Support brownfield regeneration through an affordable, high-quality and up-to-date database
- Initiate and activate owners through informational activities
- Promoting the issue of brownfields to the public, including supporting education and presenting examples of best practices to investors

Affecting the development of the Action Plan Ostrava are the following current trends in the FUA:

- The regional level of government has prepared new support for brownfield regeneration and a discussion of legislative changes and possibility to increase brownfields regeneration has been opened.
- The Office of the Government Commissioner has implemented some activities which were identified in the Action Plan into a special program RE:START (program for supporting regional development of Moravian Silesian, Ustecky and Karlovarsky regions).
- The Action Plan was introduced to a multi-resort platform ( Ministry of Industry, Ministry of Regional Development, Ministry of Agriculture, Ministry of Environment). There was an open discussion about the implementation of some objectives mentioned in the action plan into the National Brownfield Strategy.
- The introduction of Action Plan has already opened up a wider discussion with the public and especially with some of the municipal government which are in the FUA Ostrava.

### Germany – FUA Green Ring of Leipzig

The Action Plan for the FUA Green Ring Leipzig will look into the linking of compensation measures as required by German law to the revitalisation of brownfield sites through the development and implementation of a tool that supports the inter-municipal cooperation activities present in the FUA. For this, a wide range of stakeholders have been collectively managed in terms of their needs and interest in integrated environmental management.

The threats which have been agreed upon by the stakeholders will be mapped out in the entire area of the Green Ring of Leipzig. This information will be used for the identification of actions for selected sites based upon an initial integrated environmental evaluation. Actions related to land management and implementation of sustainable reuses of unused sites are to be elaborated upon by the identified and responsible stakeholders.

The actions which will be pursued in the Green Ring of Leipzig include:

1. Revision and update of the brownfield register in the Green Ring of Leipzig
2. Development and publishing of the LUMATO 1.0 Tool
3. Support inter-municipal land management through the LUMATO 1.0 Tool in the Green Ring of Leipzig with stakeholders
4. Creation of pilot projects in the Green Ring of Leipzig for sustainable brownfield redevelopment

Prioritisation of brownfield sites to be deconstructed and revitalized will take place using a stakeholder agreed upon evaluation system. This will support the steering of the FUA area to sustainable land management which is implementable.

Italy – FUA Chierese-Carmagnolese The vision being pursued in the Italian FUA of the LUMAT project is to implement sustainable land use thought integrated environmental management model at FUA level. This sets priority on:

- Protection and enhancement of ecosystem services
- Management of land uses conflicts
- Involvement of citizens and stakeholders
- Definition of strategies and solutions for the FUA level

The objective is to define a model able to manage conflicts between possible transformation and re-naturalization of brownfield and the protection of green areas at the metropolitan level. In LUMAT a model for integrated environmental management will be designed that works in the FUA and that takes advantage of structures already existing (offices and staff) and which is replicable to other FUAs. The FUA of the Chierese-Carmagnolese had been identified for the initial testing and application of the LUMAT method; the entire CMTa area could be addressed by the methodology in the future. LUMAT will use tools and methods to build/improve the capacity of CMTa administrators and technicians on integrated environmental management. Various meetings with stakeholders have already been carried out (for example with the public, city authorities and other stakeholders) and will continue in the future. The model and guidelines for the management of FUA structures will foresee:

- The preliminary statistic, territorial and environmental analysis of the FUA
- SWOT analysis for the items of interest
- Projects and sites for the implementation of green urban areas and brownfield revitalisation
- Capacity building through the use of LUMAT training materials
- InViTo use for the involvement of citizens and municipalities

The result will be an Integrated Territorial Program of Environmental Actions for the FUA (ITPEA).



## Poland – FUA Chorzów, Ruda Śląska and Świętochłowice

The “Action plan according to enhancement and development of green infrastructure in Functional Urban Area of Chorzów, Ruda Śląska and Świętochłowice with analysis and assessment of ecosystem services related to the system implementation” is proposing the integrated environmental management of chosen green areas. According to the needs which have resulted from consulting the stakeholders, two main elements of the action plan have been identified. These entail the creation of green areas on post-industrial sites and the creation of bicycle and footpaths.

The action plan provides cooperation in management, complementary investments and develops a common responsibility for the status of the nature among stakeholders. Ecosystem services (both priority and supporting eco-system services have been identified) play an important role in the action plan. Future development and upkeep of selected areas by identified stakeholders should support the needs of these services. To reach the targets, a number of tool types are recommended: remediation, phytostabilization, the enhancement of biodiversity, support for natural succession, social participation, ecological education, healthy and friendly way of life. Proper projects and designs for open space development are to be prepared and existing infrastructure to be protected. One important potential for the planned infrastructure development are railway embankments which may provide safe pathways separated from the existing road system. Most of these areas are currently out of use and are under considerable risk from investment pressure. Currently a pilot project is under construction where agreed targets of the action plan are being implemented.

## Slovakia – FUA Trnava

Trnava FUA Action Plan aims to be mid-term strategic document with a view to 2030, proposing integrated sustainable development of Trnava FUA already in process of spatial planning and emphasizing integrated environmental management of land use and exploitation of environmental services. Analytical and design approaches are both described in the Action Plan. The analytical aspect will mainly provide detailed environmental SWOT analysis of Trnava FUA, analysis of its potential with regard to ecosystem services as well as inventory of all investment intents and development projects with a view to 2030 having impact on land and ecosystem services use.

Background information for example on the location of valuable soils and areas of environmental stress are to be also evaluated with respect towards eco-system services (provisioning, supporting and cultural).

On the basis of this inventory, key parts of the action plan will be the identification of conflicts of interests and mutual synergies and drafting measures reducing these conflicts and supporting these synergies.

Stakeholder management with the ZOMOT organization, the mayors of the communities as well as members from the sectorial departments in the city administration of the city Trnava has taken place. Their interest and needs from an analysis of eco-system services are gathered in the action plan. As an example of the action plan content, the Štrky revitalization site located in the city of Trnava will be remediated into a green urban space for recreational use for the FUA residents. This action supports the LUMAT goal of creating more livable spaces on a land parcel that represents a threat to the environment because of the historical deposit of contamination on the site. The site will be upgraded so that it plays an important role in the recreational offerings in the FUA.

## Slovenia – FUA Kranj

*„FUA Kranj, a generator of circular economy in Gorenjska region“*

Based on the sustainable development of society, circular economy, the action plan will serve the purpose to improve the competitiveness of the economy through effective land management and to serve as a foundation for the implementation of new EU guidelines related to land use development („zero land take“). The Action Plan focus is on spurring inner urban development, preventing greenfield developments and urban sprawl from taking place and searching for synergies within FUA municipalities with public and private stakeholders.

### Priority Objectives

- efficient management of business zones
- encouraging the renovation of degraded and underused areas

### (Sub)-objectives

- conservation and efficient management of natural resources
- ensuring the quality of the living and working environment
- integrated management of business and economic zones
- re-activation of degraded and underused areas and prevention of new brownfields
- promoting sustainable mobility for business zones
- restrictive approach to greenfield developments and supporting approach to brownfields
- supporting the consolidation of ownership structure in zones with fragmented ownership

The pilot actions for the Kranj FUA are split into 4 thematic groups: management of business zones, financial instruments, sustainable spatial development instruments





and finally legal instruments. In the FUA, the Regional Development Programme and the Regional Spatial Development Strategy (new spatial legislation, 2017) are being prepared and the Action Plan developed in the LUMAT project will support these activities, as well as other local development documents. This will ensure the longer term impact of the action plan after the end of the LUMAT project.

### Transnational Comparison for the Content, Process and Application of Action Plans

The contents of the action plans in Central Europe are focused on the analysis and use of brownfield potentials for the improvement of eco-system services. This can be seen in the example from the Czech Republic with the analysis of the reuse of brownfields as green spaces to add more air purification to the FUA or by the example in Italy for the protection of green spaces in the landscape through the re-naturation of brownfields. Opportunities for brownfield regeneration also include the efficient steering of business interests in a FUA to unused and underused sites, as is being pursued in the Slovenian FUA of Kranj with the adaptation of the circular flow land management concept. Further threat analysis and the items to be addressed are being looked into by all partner organizations.

### Process

The processes for action plan development are heavily dependent upon the management of the stakeholders in the FUA. This is because the interests that they represent require a specifically tailored approach to reach the desired objectives. In Austria, the intensive discussions with the various members of the surrounding communities is an important in coordinating the projects that are to take place on former mining areas; the process being pursued in Austria allows for a greater differentiation and strategic use of the sites. In all partner FUAs, an evaluation of the eco-system services and the use of this information to prioritise future actions are all central to the process being pursued.

### Application

The application of the LUMAT action plans are described in the following table. Beyond the planned investments in the pilot sites in Poland and Slovakia, there are tools and management structures that will come to fruition thanks to the LUMAT project. For example the LUMAT partners in the German FUA are creating such a tool that allows stakeholders to identify the existing potentials for revitalisation and integrated environmental management actions on brownfield sites. The InViTo tool from the Italian LUMAT partners will be used for the direct

LUMAT Country	Action Plan Content
AT	Recognition of the opportunities present in each village of the FUA region and how these could best improve on their existing character and present eco-system services. Involvement of the mining company in the region to determine sustainable after uses of former mining land.
CZ	Regeneration of brownfield sites for improved air purification through eco-system services and also improving land recycling processes in the FUA through aimed for active management responsibilities and support for new legislation.
DE	Analysis of multi-sectoral threats to eco-system services present in the FUA and evaluating this information in a specially developed tool with stakeholder involvement. Also, content includes evaluating the potentials which are offered by brownfield sites for the protection of soil resources and the minimization of threats.
IT	Transformation and re-naturalisation of brownfield sites for improving the green infrastructure in the FUA. Also, green spaces are to be protected in the area through sustainable planning designations /land management and stakeholder management.
PL	Use of the potentials offered by post-industrial sites for the creation of blue and green infrastructure, for example through the use of brownfield sites for the creation of bicycle network systems. Also, the investment in the implementation of a brownfield revitalisation in a residential area which includes the stabilization and upgrading of an abandoned heap site for future recreational use.
SI	Sustainable development of the FUA through the application of a circular economy concept that pushes for effective land management of underused and unused sites and contributes towards a zero net land take objective.
SK	Analysis of threats present in the region to soil and land resources and their mapping for the region and the integrated evaluation of these threats with the FUA stakeholders. Also, a planned investment in the revitalisation of a contaminated site into a new recreational opportunity for the residents in the FUA.

Table 3: Summary of Content in the Partner Action Plans. (Siemer, B., 2017)



LUMAT Country	Action Plan Process
AT	Stakeholder meetings with the decision-makers and citizens in the FUA as well as from the local mining company to harmonize a vision and to agree upon actions that are tailored to the local communities in the FUA.
CZ	Adaptation to current trends in Czech Republic for the dealing of brownfield issues by taking into account the legislative changes planned and the funding schemes available for brownfield revitalisation. Also, an inter-sectoral discussion with stakeholders from various ministries have taken place to diversify the input in the Action Plan for the FUA Ostrava.
DE	Implementation of inter-municipal cooperation and stakeholder management for sustainable land management and integrated environmental analysis by using the existing platform for inter-municipal cooperation in the area to pursue common action. Creation of feasibility studies to guide actions and to learn from what is required for brownfield revitalisation in the FUA Leipzig. Creation of a tool with the stakeholders to address their needs for integrated environmental management.
IT	Involvement of stakeholders for an entire FUA and the identification and management of land use conflicts among 22 communities in the FUA.
PL	Ecosystem analysis, prioritisation of eco-system services in integrated environmental management
SI	Management of business zones for efficient use and the stakeholder management needed for this in the FUA. Encourage the use and renovation of degraded and underused areas.
SK	Involvement of stakeholders for an entire FUA for the management of land use conflicts among the communities in the FUA.

Table 4: Summary of Process in the Partner Action Plans. (Siemer, B., 2017)

LUMAT Country	Action Plan Application
AT	Pilot projects that are tailored to the needs of the stakeholders present in each village, for example: flower gardens for wedding sites, eco-garden concepts using geo-thermal energy, establishing a bike path connection between the communities, and other possible projects.
CZ	Creation of new responsibilities in existing structures in the FUA to carry out actions on brownfield sites. This includes for example the creation of a position for a "brownfield manager", creation of an interactive database with information on brownfield potentials and solutions for reuse as well as carrying out of public awareness activities.
DE	The application of the standardized tool (LUMATO 1.0) to identify the threats to land and soil resources present in the FUA. The tool will provide an initial evaluation and prioritisation for action on these sites for stakeholders to consider. Feasibility studies for reuse of brownfields will support the development of the tool with a foundation of the type of information that has to be available.
IT	Use of existing structures for implementation of responsibilities (staff and offices) for integrated environmental management and the protection of eco-system services. Creation of an Integrated Territorial Program of Environmental Action (ITPEA). Applying an interactive tool (InViTo) for the gathering of stakeholder feedback in-situ for the improvement of living conditions.
PL	Site specific actions. Management of interests in various municipalities of the FUA for the improvement of blue and green infrastructures with a focus on cultural and supporting eco-system services.
SI	Supporting the current development of the Regional Development Programme and the Regional Spatial Development Strategy in the Kranj FUA for a longer term impact of the LUMAT project in the area. Management of business zones, financial, spatial and legal instruments.
SK	Application of goals on an example site for revitalisation (Strky) to re-introduce and strengthen recreational uses in the the FUA for residents to enjoy.

Table 5: Summary of Application in the Partner Action Plans. (Siemer, B., 2017)



collection of input from stakeholders regarding the improvement of living conditions and integrated environmental management. Finally, many of the applications in the LUMAT project will influence the existing legislative landscape present in the partner countries, mainly in regards to the reuse of brownfields and the reduction of soil consumption.

### **Making Central European Places More Liveable**

The central theme of the action plans is to make FUAs more liveable according to the needs and interest of the stakeholders present in each FUA. By looking beyond the municipal boundaries at the FUA level, the LUMAT partners have been able to identify new potentials for eco-system improvement as well as a wide range of stakeholders which are to be involved in making integrated environmental management a reality. New synergies have been formulated that could not have come to fruition within a single city administrative borders.

The analysis, stakeholder management, scientific evaluation and the identifications of visions, goals and objectives are all collectively gathered in the partner action plans. Important to note is the agreement among the partners regarding the importance of the revitalisation of brownfields in all of the FUAs. These sites have a variety of unrealized potentials for the realisation of sustainable land use through pilot actions. The first actions towards sustainable land management are to be implemented in the next Work Package of the project, WP T3 within the LUMAT project.

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## **ACTION PLANS FOR INTEGRATED ENVIRONMENTAL MANAGEMENT FOR RUDA ŚLĄSKA FUA AND TRNAVA FUA AND PILOT INVESTMENTS IN RUDA ŚLĄSKA AND TRNAVA**

### **Abstract:**

In the paper there are two case studies, prepared during the LUMAT project run, presented. These case studies are from Poland and Slovakia, as just these two case studies are followed by the pilot investments planned and funded in the frame of the LUMAT project. They are based on elaborated deliverables in the workpackages of the LUMAT project. The other five case studies from the Czech Republic, Slovenia, Germany, Austria and Italy have been elaborated in the form of action plans of the areas investigated, within the activities of the LUMAT project and as such are prepared for investments under the national funding.

### **Key words:**

*action plan, development strategy, management structures, pilot investment*



# **RUDA Śląska**

### **ACTION PLAN and PILOT INVESTMENT for INTEGRATED ENVIRONMENTAL MANAGEMENT for RUDA ŚLĄSKA FUA**

#### **Regional context**

Functional urban area of Ruda Śląska is composed of three cities-Chorzów, Ruda Śląska and Świętochłowice. It is located inside the Silesian Metropolitan Area which includes 14 cities. The regional context is mainly metropolitan context as basing on the order of the Ministers Council from 9 March 2017 the Śląsko-Zagłębiowska Metropolis has been established. The area covering 2 553 km<sup>2</sup>, is a dynamic economic centre but also a centre of concentration of medical services as well as academic, cultural and sports services. The Metropolis is the largest urban centre in Poland. Regarding natural resources it is a unique area due to the presence of terrains covered with natural succession. The second exceptional feature is the occurrence of numerous water reservoirs of anthropogenic origin. It is the effect of an intensive, longterm and specific economic activity connected with mining exploitation.

The analysed three cities have raised and developed basing of heavy industry, mainly coal mining and ferrous as well as non-ferrous metallurgy. The spatial structure of these cities constitutes a mosaic of functions and areas of various predestination. It has been defined mainly by the development and many-years functioning of industrial

plants located within their borders. In the neighbourhood of the urban centres the industrial and post-industrial objects and areas are located such as spoil heaps and dumping sites.

Post-industrial areas present a characteristic environmental resource which is also valuable due to vegetation succession.

The stake of anthropogenic areas reaches 55,71% of the whole surface area of the FUA, which means a high level of its transformation.

#### **Action Plan Implementation vs Development Strategy of the FUA**

There are several documents concerning the FUA which define its character, features and conditions both economic, environmental and social as well as the document presenting the framework of its development. It is the Integrated Development Strategy of the FUA of Chorzów, Ruda Śląska and Świętochłowice until 2030. In this document the green infrastructure issues are included in the chapters concerning ecology, natural resources and green areas.

Natural resources constitute an important element connecting three cities as well as it is a potential, which can and should be used as a development factor which contributes to raising the quality of life and touristic attractiveness of the area. It is recommended in the Strategy to create a common policy concerning ecology and environmental quality.

#### **ACTION PLAN FUA RUDA ŚLĄSKA**

Functional Urban Area of Ruda Śląska will be in 2030 an area enriched with a harmonized green infrastructure system serving to protection of natural capital and raising the quality of life of the inhabitants.

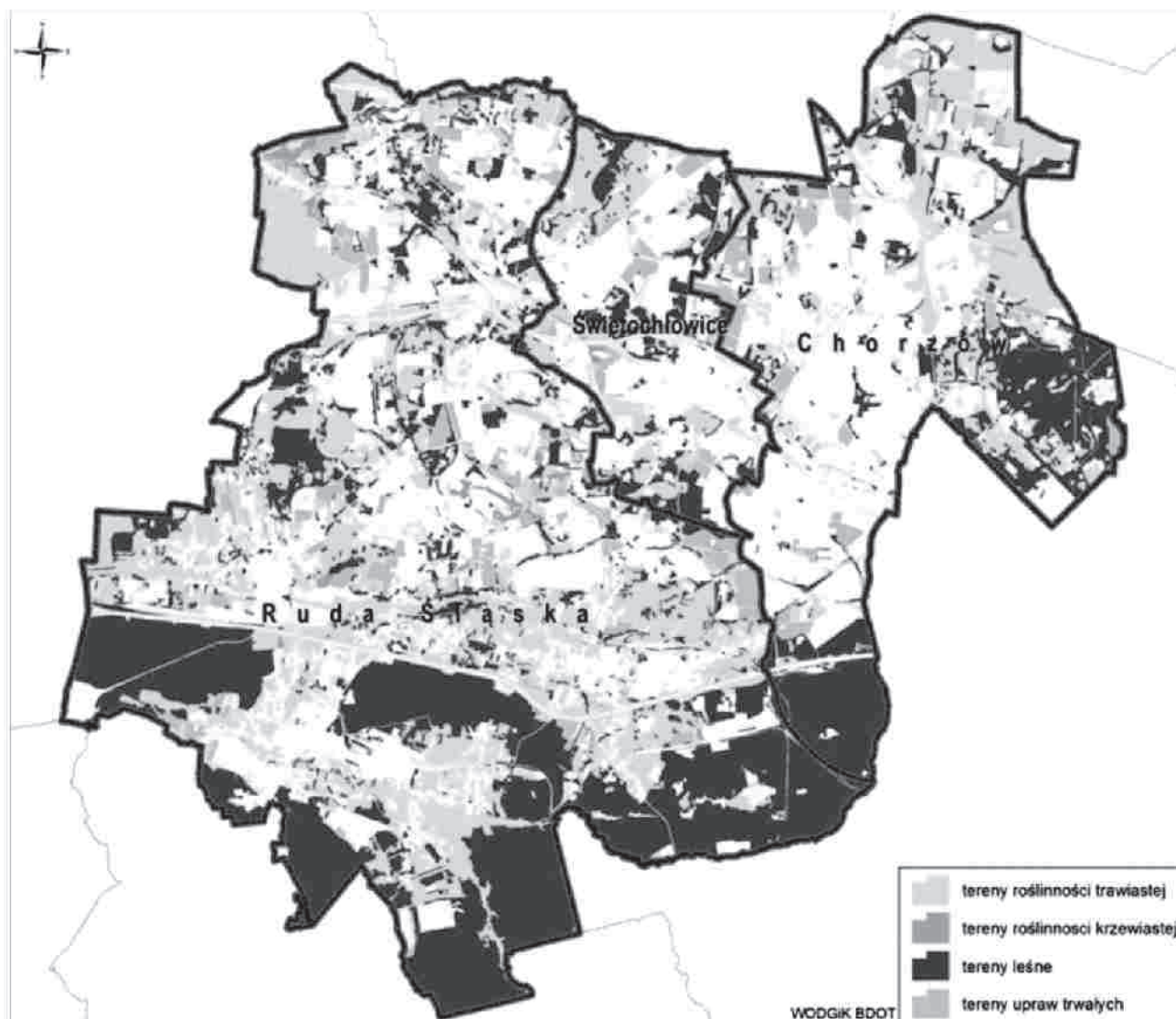


Figure 1: Green areas in the FUA of: Chorzów, Ruda Śląska and Świętochłowice. (IETU, 2017)

The Action Plan mission in the aspect of nature is strengthening connections of natural system of the FUA cities as an essential component of the Metropolis creating blue and green infrastructure. The efficient natural system with active ecological corridors connecting natural valuable areas will provide strengthening of self-regulation processes, resistance to climate change and stability of ecosystem services.

In the social aspect the Action Plan is aiming at propagation of the idea of healthy life style by creation of biking and walking routes in areas of a high natural potential increasing at the same time an access to ecosystem services connected with bio climate beneficial for people and necessary for a proper functioning of human organism. The proposed solutions are also to prevent social exclusion of disabled people and these of low income. Ecological education is an integral part of the action plan popularizing knowledge on values of native nature – animals and plants – on processes connected with

re-naturalisation of post-industrial areas stimulating also care for an environment by its proper maintenance of purity and aesthetics.

In the economic aspect the proposed system of communication connections based on biking traffic inside cities and between them as well as their recreation attractiveness should affect reduction of the car traffic and costs connected with it. The attractive sites should also attract investments in form of line parks, gastronomy objects etc.

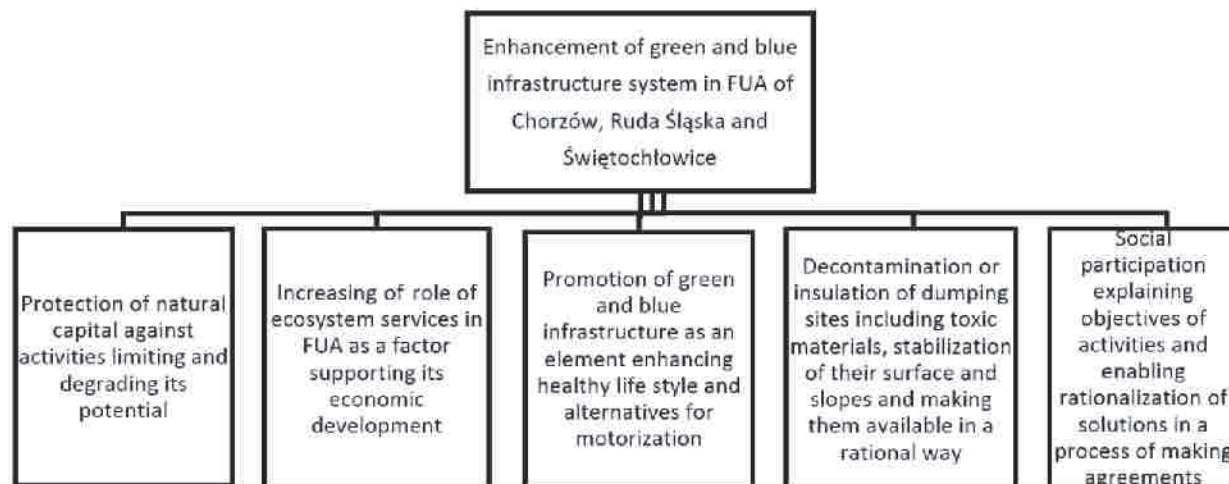
In the spatial aspect it is essential to build safe system of biking routes beyond car traffic roads. They will connect the cities of the FUA and different districts. Many of the proposed routes will be constructed basing on the abandoned railway tracks. The efficient system of biking routes favours a spatial order, but also it is important to integrate it with a comprehensive mapping out recreation and housing areas.



The Action Plan objective:

*Enhancement of green and blue infrastructure system in the FUA of Chorzów, Ruda Śląska and Świętochłowice*

The system of the Action Plan sub-objectives is presented below.



## ACTIVITIES FOR ENHANCEMENT AND DEVELOPMENT OF GREEN AND BLUE INFRASTRUCTURE

The activities connected with enhancement and development of green infrastructure can be divided in three groups defining their character:

- Technical activities
- Organization and legal activities
- Information and education activities

Technical activities include all kinds of investments presented in the Action Plan as well as complementary activities being implemented in the framework of other programs or projects (e.g. Rudzki Route Program in Ruda Śląska) or projects based on other contracts or initiatives (Adaptation Plans to Climate Change being elaborated for Chorzów and Ruda Śląska).

Within the catalogue of technical activities the following can be proposed as an example:

- Construction of walking and biking routes through valuable natural areas as well as functional connections between existing routes and tracks,
- Reconstruction of tree stand, new planting.
- Re-arrangement of the space and introduction of small architecture elements – benches, information boards etc.
- Construction of education routes,
- Construction or cleaning of existing small retention reservoirs,
- Arrangement for recreation of areas surrounding water reservoirs – urban beaches, marinas,
- Construction of sports grounds and play grounds,

Arrangement of parts of the areas for active recreation and summer and winter sports (extreme biking routes, sledge hillocks, jogging routes).

Legal and organization activities include changes of land use planning documents by introducing records on green and blue infrastructure. There can also be study concepts concerning spatial solutions as well as documents proposing administration and legal solutions aiming at systemic management of these areas.

These activities can be addressed to one city or can constitute common initiatives e.g. monitoring system of the whole area. They can be also projects concerning changing of legal records e.g. concerning public procurement procedures (introducing for instance necessity of ecosystem services assessment and/or green infrastructure issues in the records of terms of reference for land use plans). This group of activities includes also proposal of creating common structures responsible for development of green infrastructure (e.g. biodiversity supervision) and proper use of ecosystem services.

Information and education activities constitute a wide spectrum of ideas and initiatives directed towards informing the local society on natural values and possibilities of using the recreation potential of these areas. Apart from information on cities web sites and in local press also the information should be addressed directly to the users of the green infrastructure. In the framework of these activities the Information system should be built available in the form of application for mobile devices. The range of information can concern an access to the areas and can inform on events that are organized in concrete places of the system.



These can be also competitions for children and youth and education campaigns addressed to various beneficiaries of these solutions as well as wide campaigns promoting the green infrastructure as an essential element raising the quality of life in cities of the FUA.

In the Action Plan 25 areas in three cities have been selected. In Ruda Śląska – 8 areas, in Chorzów 6 areas + 7 areas in Silesian Park located within Chorzów territory and 4 areas in Świętochłowice.

In 10 areas regulation services are prevailing as present ecosystem services. In 11 areas culture services are indicated as present ecosystem services. In almost all areas these services are dominating. In 21 cases supply services are pointed especially water supply services.

Potential ecosystem services include mostly culture services, supporting services and supply services. Regulating services are indicated only in one case.

## IMPLEMENTATION OF ACTION PLAN – MANAGEMENT STRUCTURE

The Functional Urban Area includes three cities: Chorzów, Ruda Śląska and Świętochłowice and it is an integrated area, identified as a result of delimitation of areas characterized with common problems as well as areas with features deciding on its strength and development potential. Identification of development factors and barriers in this area allowed to define optimal final range of the functional area from the view point of transport and settlement efficiency, life quality and access to public services. Therefore the range of the functional area has been defined basing on real connections but not formal ones.

In the case of the action plan of strengthening and development of green infrastructure for these three cities, the management of this plan should be carried out with participation of these cities basing on a defined form of co-operation.

It should be stressed that a strong structure bonding the cities towards implementation of the action plan imposes stronger obligation to the cities to realization of tasks inscribed in the plan. Establishing a structure for action plan implementation is a consequence of the acceptance of the LUMAT project initiative expressed earlier as well as will of co-operation at elaboration of the action plan concept. Following these declarations the city of Chorzów has established the team for realization of these tasks and the city of Świętochłowice has accepted the idea in a special letter issued by the Mayor. The city of Ruda Śląska – being the project partner is involved in the work in the framework of its tasks in the project.

It is proposed to establish a structure called Permanent Conference (Permanent Task Force/Working Group) for Implementation of Green Infrastructure In the Functional Urban Area of Chorzów, Ruda Śląska and Świętochłowice,

which should include the group of teams which have been working on the concept of the Action Plan in the framework of LUMAT. This group will be composed of officials from three cities of the FUA, representing departments of environmental management, land use planning, municipal and development. Participation of these people is coherent with the idea of the LUMAT, whose objective is integration of sustainable environmental management with land use planning and management in functional urban areas. Implementation of the plan concerning strengthening and development of green infrastructure requires co-operation of these departments.

## PILOT INVESTMENT

The first concept of the plan has been designed, based on consultations with stakeholders. After thorough assessment of local conditions, threats and relations the final concept of the plan has been prepared.

According to landform change northern slope is transformed. Limited part is left untouched as the „memory of the place” - high crag with moss and grass plant cover, with matured birch tree and some outcrop of spoil heap material with slag sinters. Some information points of educational path connected with slag features and metallophyte plants are placed nearby. The slope will be planted with birches, oaks and ash trees in geometrical groups to support expression of manmade landscape, but with use of native trees. On the area northern edge is designed Land Art made of hornbeam trees. On the middle of heap top is designed view point in form of hill about 5 m high. That will be made of spoil heap material and covered by clay, soil and sown by grass.

There will be installed lunette, some benches and educational path point. To the north of view point is designed sledge slope. Other top area will be flattened and treat with phytostabilization to neutralize heavy metals contamination. To the west of view point is located playing field. It will be sown densely than other places, and will be well maintained. Around the playing field is designed low dike with tubes-tunnels for children play. Furthermore to the west will be placed grill area under canopy of birches. Places for grill stands will have form of gravel square pits surrounded by timber kerbs. Dark basalt gravel correspond to zinc slag but is not contaminated. Stands for grill will be separated by the dashed lines of miscanthus. That will give sense of intimacy providing kind of green wall maze for children play.

By the centre of area a main path joining 1 Maja Street with "Trakt Rudzki" path will be built. Near western end, on the place where the path will reach top ground platform are designed concrete hammocks.

These constructions will have timber cover suitable to sit on and handles to mount own hammock. Quite near to them there are designed view concrete boxes with two deck



chairs in each. Intimate space, with view outlined by edge of box will have boards of educational path with information about local history, industrial revolution, zinc production technology, features of spoil heap material and metallophyte plants.

To the south of main path there will be located three iron factory vats on the slag spot. Vat will be filled with soil and planted *Lycium barbarum* - boxthorn. That shrub has falling down branches, bright silver-green leaves and can symbolize liquid metal in high temperature. Around vats will be small basin with slag gravel and educational board with zinc and iron production technology. Near vats will be placed next group of hammocks.

In the whole area there are designed boards of educational paths with information about local history, industrial revolution, zinc production technology, features of spoil heap material, metallophyte plants, spontaneous flora, birds living around and area information system.

On the side path curve is designed second - "small" view point. Following that path one can find open space gym.

There is either the place for boulder of zinc ore with educational board. Some additional hammocks stand there on the slope edge.

On the east border is jumping track for BMX bicycles located in dean made of coal mine rock. Slopes of dean will be covered by clay and grass. Track path will be covered by clay and lime gravel. The same surface is designed for BMX circus in eastern border of area. Circus has form of round dike with ramps about 2m high, with walls suited to bike extreme rides and jumps.

On south border there is another path going to playground designed. In the main area of the playground there is the designed wooden construction in the form of industrial structure with some connotations to coal mine lift tower, drift or some iron and zinc factory dwellings. Additionally were designed various slides and modern play equipment which may be associated with industry but giving the same time high quality play proposition. Educational boards with information about that kind of plants are put nearby.

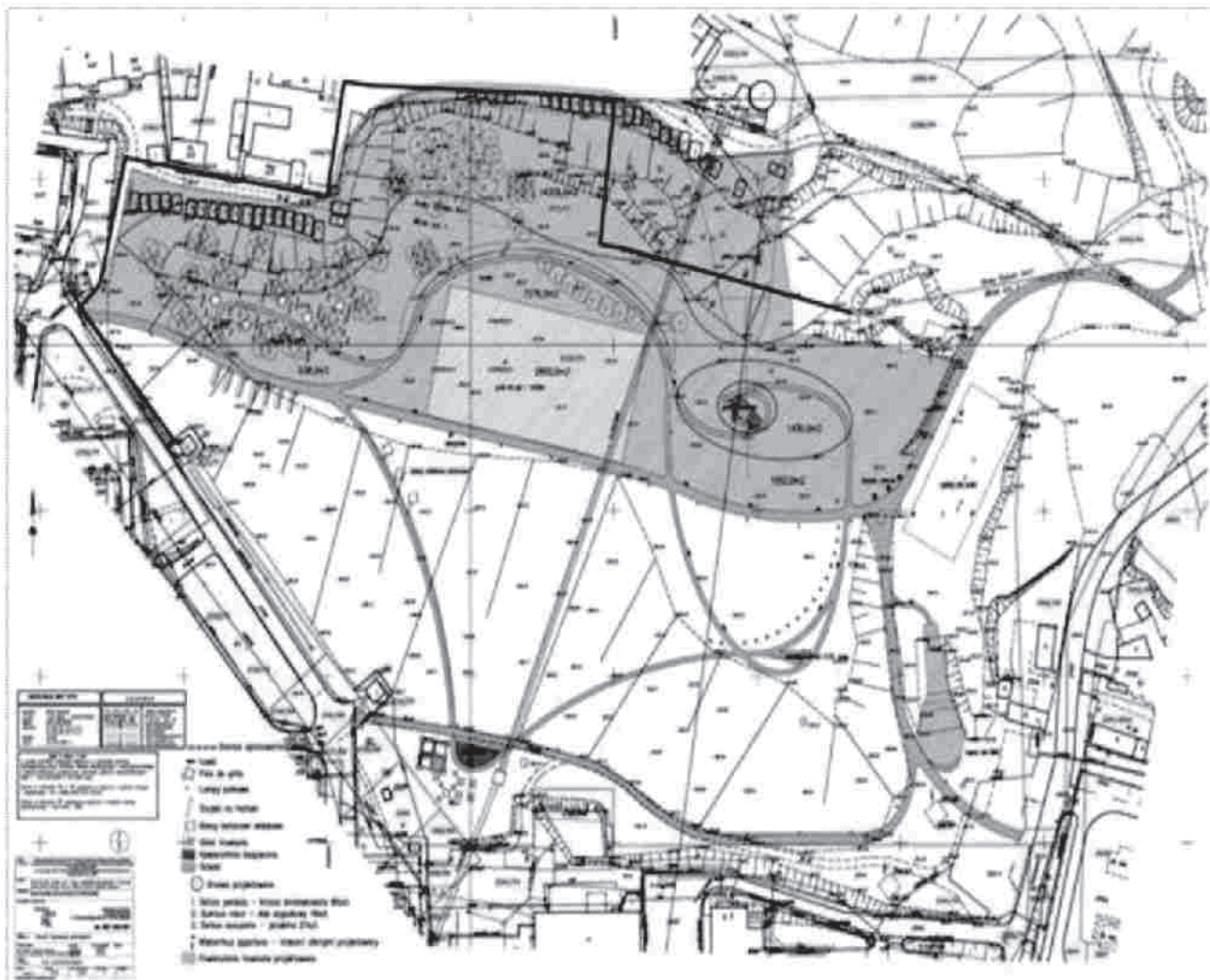


Figure 2: Design concept plan (HORTUS, 2017)





Figure 3: Visualisation of view boxes. (HORTUS, 2017)



Figure 4: Visualisation of hammocks. (HORTUS, 2017)



**Mesto  
TRNAVA**

## **ACTION PLAN and PILOT INVESTMENT for INTEGRATED ENVIRONMENTAL MANAGEMENT for FUA TRNAVA**

### **Regional Context**

The elaboration of the "Action Plan of Integrated Environmental Management of Trnava Functional Urban Area" has been provided in the frame of the LUMAT project. The Action plan is a mid-term strategy document with the prospect of the year 2030 with the aim of designing an integrated, sustainable management of using the territory of the Trnava functional urban area (FUA Trnava) in the process of spatial planning with an emphasis on integrated management of environmental protection and integrated land use. In line with expert focus of project LUMAT, the Action Plan emphasizes integrated environmental management of soil use and ecosystem services in the area concerned.

On the basis of Conception of Territorial Development of Slovakia 2001 as amended by KURS 2011 and the measures in the sense of Art. 7 Regulation of EP and

Council (EU) Trnava was defined for the purpose of promoting sustainable urban development as a county city, together with a functional territory consisting of 13 municipalities: Biely Kostol, Bohdanovce nad Trnavou, Brestovany, Bučany, Dolné Lovčice, Hrnčiarovce nad Parnou, Jaslovské Bohunice, Malženice, Šelpice, Špačince, Zavar, Zeleneč, Zvončín.

On the basis of local relations and functional links, the urban functional area was extended with the municipalities Ružindol and Suchá nad Parnou. From a geomorphological point of view, the territory consists of a geomorphological unit - Podunajská nížina (part of Trnavská pahorkatina and Podunajská rovina). Podunajská nížina is built by neogene clay, sand and gravel, which are covered with loess in the hill-lands parts and with river sediments in river alluvium. On loess is binded the existence of black soils which towards to Lesser Carpathians passes into brown soils and represents the most fertile lands of Slovakia.

From the natural resources in the territory point of view, there are high quality soils which, with favorable climatic conditions, create a high potential for agricultural development. From the functional typization point of view, rural villages have an agricultural character with a residential, partially recreational function (Kamenný Mlyn). Agricultural production is specialized in both plant and livestock production. In plant production dominates farming on arable land.

Dominant representation has the cultivation of densely sown cereals, which represents high-yielding crops with relatively low cost. A specific but characteristic crop for the territory is also corn. Recently, the cultivation of oilseed rape and sunflower comes to the forefront. Wine-growing, fruit-growing and gardening are partly represented. A smaller share of territory falls on permanent grassland. Animal production specializes mainly on pig breeding and cattle breeding, in particular for meat and milk. From an industrial point of view, FUA belongs to the most advanced areas of Slovakia. Industrial production is concentrated in city of Trnava. Within industrial production dominates engineering, food and textile industry. Within the whole of the country, the region dominates in production of electricity. In Jaslovské Bohunice is localized a nuclear power plant.

The economic activity of other rural settlements is represented by small production, storage and repair services. The territory is also very important in terms of transportation. It is close to the capital of the Slovak Republic, from which is 50 km away. There are important transport corridors: highway Bratislava - Trnava - Považie highway and railway line Bratislava - Žilina - Košice - Ukraine. From the environmental point of view, area of interest represents industrially-agriculturally intensively used land with specific environmental problems resulting from the development of industry and agriculture (a strong degree of contamination of individual components of the environment, PPF degradation processes due to improper land management, inappropriate crop structure, etc.) It is a



highly anthropic country with a very low degree of ecological stability. It is a highly anthropic land with a very low degree of ecological stability.

**Action Plan Implementation vs Development Strategy of the FUA**

Territorial planning systematically and comprehensively solves the spatial organization and functional use of the territory, its principles are determined, the timing and coordination of activities influencing the environment, ecological stability, cultural and historical values of the territory, spatial development and landscape creation in accordance with the principles of sustainable development. Spatial planning therefore creates the prerequisites for the continued consistency of all activities in the area, with emphasis on environmental care,

ecological balance and sustainable development, the friendly use of natural resources and the preservation of natural, civilization and cultural values.

The aim of spatial planning is to create the conditions for sustainable development through a continuous and comprehensive solution of the spatial arrangement of the territory and the functional use of the territory. Territorial planning in the public interest determines the economic use of the built-up area and protects the non-built up area.

The inventory of functional areas has been elaborated on the basis of digitized comprehensive urban designs, which contains a proposal of functional use and spatial arrangement of the territory. The functional areas were categorized as follows:

- Proposals of areas supporting the sustainable land use and ecosystem services
- Proposals of areas affecting the landuse, soil and ecosystem services

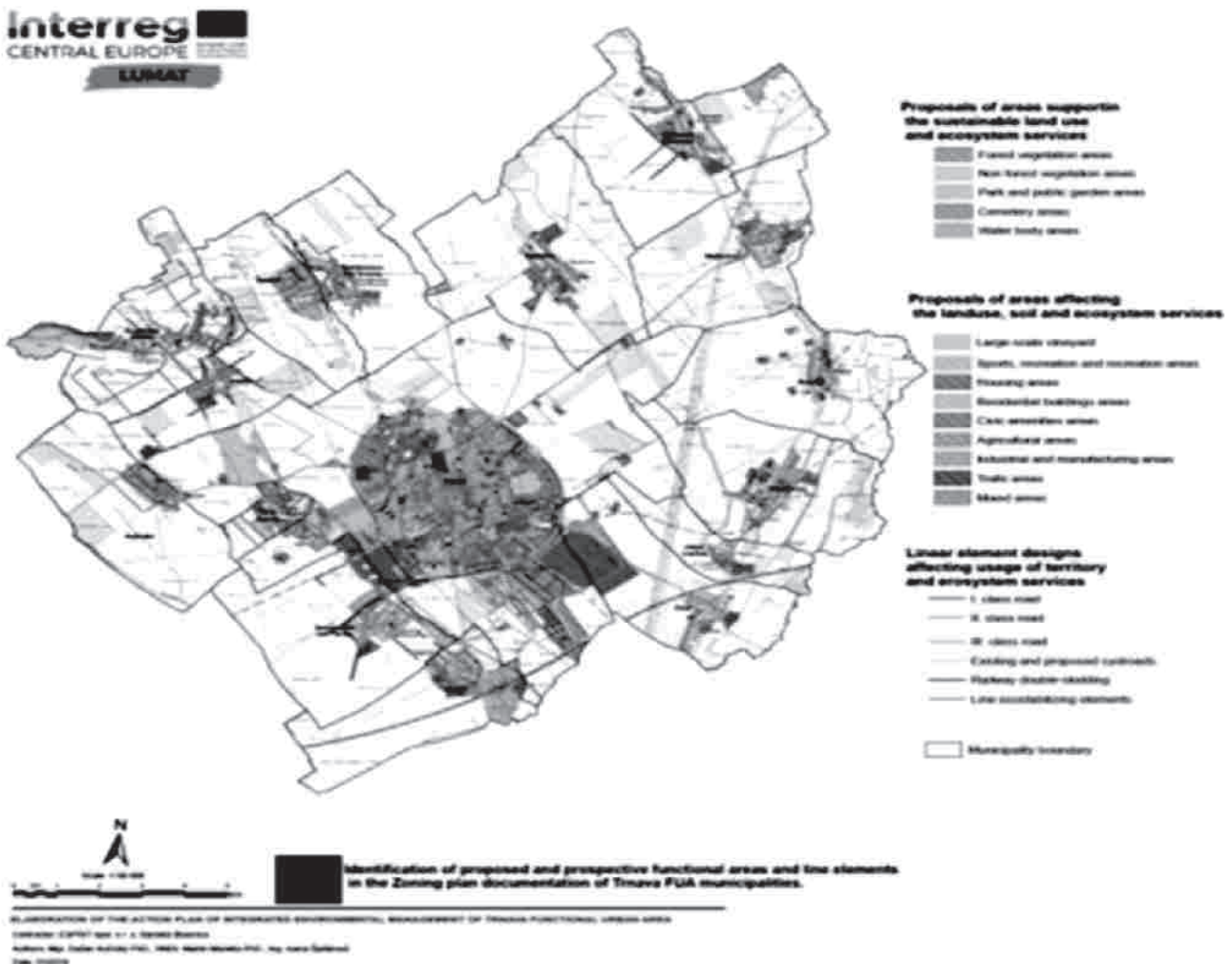


Figure 5: Identification of proposed and prospective functional areas. (ESPRIT, Ltd., 2018)



The spatial location of the individual design categories is in Fig. 1 "Identification of proposed and prospective functional areas and line elements in the zoning plan documentation of Trnava FUA municipalities".

## ACTION PLAN FUA TRNAVA

The nature of integrated environmental management is reflected in the coordination of sectorial planning and management of activities in field of land use and use of its resources. The landscape and its resources are used for various purposes that influence each other and compete between themselves. Therefore, the whole land use process should be planned and managed the integrated way.

The main principles to be applied in decision-making processes on land use proposals as well as in the implementation and localization of new socio-economic activities in a given area are as follows:

- a) Principles of management in protected areas: In protected areas (nature conservation areas, NATURA 2000 elements), ecologically valuable and stable areas (sites of the territorial system of ecological stability) priority must be given to the development that does not endanger the natural values of landscape units, especially the development of scientific, research, cognitive, nature-protective or recreational activities.
- b) Principles of management in areas with natural resources protection: If natural resource protection is legislatively defined, the relevant rules determine which socio-economic activities should be excluded from the area as they could negatively affect individual natural resources. It also shows which activities could support protective functions, which of course must be developed as a matter of priority.
- c) Principles of management in areas burdened by stress factors: The burden by stress factors such as polluted air, soil and water contamination, excessive noise loads represent significant hygiene limits for the development of individual socio-economic activities. They greatly limit interests of development of those socio-economic activities in particular that are sensitive to the hygienic parameters of the environment, such as residential and school areas, recreational areas, sports and physical education facilities, sanatoriums, hospitals, and others.
- d) Principles of management in protection zones of transport corridors: The protection zones of the transport corridors have the character of line elements. In addition to hygiene limits, they also act as technical-security zones with purpose of thier protection and also their secure operation. In addition to the implementation of socioeconomic

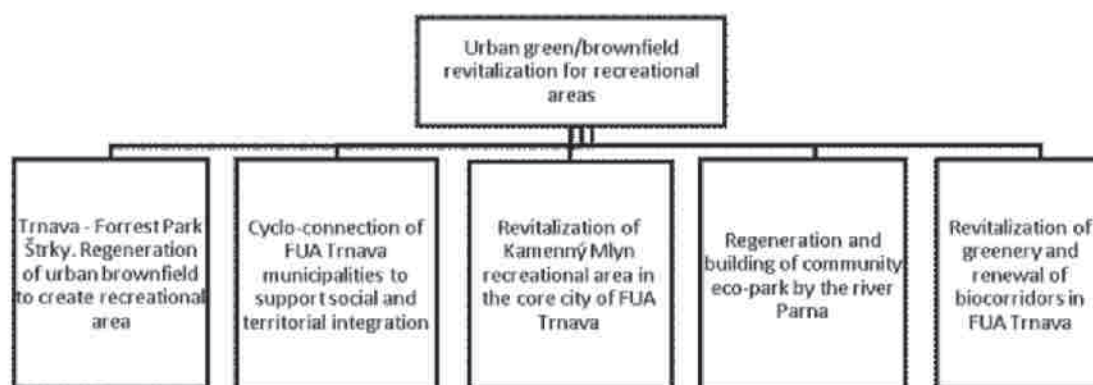
activities with considerable requirements on hygienic parameters, in these zones is also prohibited to establish structures and to make surface modifications that would disrupt the stability of the site, build facilities and objects that would endanger the mentioned technical works and ensure their smooth and safe operation. Similar limits and restrictions also apply to the protection zones of other technical lines - power lines, pipelines, cable lines, and others.

- e) Principles of management in areas most endangered by drying out: The most important measures for active adaptation to climate change are, in particular, activities to ensure efficient water management by ensuring optimal runoff rates in the landscape, supporting water retention in the landscape (by creating retention volumes for rain water), integrated river basin management, correct river basin management, flood protection and the use of effective irrigation (irrigation details) for the continuation of agriculture. Such measures include an appropriate combination of preventive technical measures on river flows and on agricultural and forest soils as well as the use of green infrastructure in the country.
- f) Principles of management in areas with low ecological stability: Ensure the necessary spatial ecological stability - build a functional territorial ecological stability system so that all representative ecosystems of the region are represented within the biocenter, in case of their absence it is necessary to build or revitalize them and provide them the necessary protection. Strengthen the spatial representation of natural ecosystems in an intensely agriculturally used land, restore the original REPGES, complement forest ecosystems with required ecological and environmental functions such as ensuring soil erosion protection, ensuring the counter-runoff functions of the area, avoiding soil drying and increasing the amount of retentive built-up areas.

### The Action Plan objective:

Urban green/brownfield revitalization for recreational areas.

**The system of the Action Plan sub-objectives is presented below.**



### ACTIVITIES FOR ENHANCEMENT AND DEVELOPMENT of Urban green/brownfield revitalization fro recreational areas

The activities are mainly related to the urbanized environment. The basic measures of this group include:

- to ensure the planting of insulating hygienic vegetation around anthropogenic objects with negative environmental impacts - agricultural and industrial objects, storage areas, etc. In particular, to isolate large sources of air pollution in Trnava,
- to consider the use of the Suchá nad Parnou water reservoir for recreational purposes with regard to its current pollution status. Synchronize the use of the reservoir with its biocentre function;
- to carry out a detailed survey of the burdens on individual components of the environment in order to accurately identify over-burdened parcels and to ensure regular monitoring of the individual components of the environment;
- in the case of newly-proposed activities to apply law No. 24/2006 Coll. on environmental impact assessment with active involvement of the public in the evaluation process and to prefer alternatives with minimal impact on the environment;
- to add ecostabilizing and aesthetically appropriate elements of the landscape structure in the area of interest, which represents an intensely agriculturally used landscape;
- to provide protection, especially fo older deciduous woods, complementing the typical character of the settlements. In new plantings, to prefer deciduous woods habitually preferable to the area of the settlements;
- to preserve landscape-aesthetically important features and landscape structures;
- to apply aesthetically impressive elements in shaping of settlements in order to increase their overall attractiveness;

- revitalize and maintain deciduous parks in settlements;
- implementation of the city bypass (south and northwest), which will ensure the diversion of transit traffic of all higher-class roads connected to the urban system,
- planting of urban greenery- to settlements with the smallest share of public greenery belong Malženice, Hrnčiarovce nad Parnou, Dolné Lovčice, Zvončín, Zavar a Biely Kostol, where the share of public greenery is below 2 %,
- reconstruction and modernization of existing bike trails, construction of new bike trails connecting the settlements as well as urban cycling routes.

### IMPLEMENTATION OF ACTION PLAN – MANAGEMENT STRUCTURE

The Action Plan includes projects and sub-projects that involve various interventions in the form of regulations, investments, socio-economic and environmental measures to implement integrated environmental management proposals. In the action plan there are proposals for measures to remove conflicts of interest and promote mutual synergies and also provides a more detailed description and their objectives for the selected proposed measures in relation to the current state of completion of the individual projects. It also proposes the responsibility for the implementation of the given measures, the timeframe for implementation, the approximate costs of implementation and financial source.

The action plan strengthening and development of green infrastructure for the FUA Trnava, the management of this plan has been carried out with participation of the involved municipalities, based on a defined form of co-operation. This is „Association of the municipalities of FUA Trnava - ZOMOT“ that exists as an independent legal entity and has been formed in 2016. Since that time the cooperation of 15 municipalities and the core city of Trnava is regular, based on meetings of the mayors of these municipalities and participation of the citizens.



Figure 6: Identification of proposed areas and design elements. Visualisation of the Forest Park Štrky. (Eurosense, Ltd., 2017)

In particular, it involves cooperation in building safe and environmentally friendly transport, improving the quality of life of the population through reconstructions, building collection yards and public spaces. Social background and health facilities, social facilities, health centers and school facilities. of municipalities also play an important role.

The increasing importance of the need for cooperation has its reasons also in transferring an increasing number of tasks from the central level to the local level, which often can not be efficiently secured by individual municipalities due to the Slovak structure of municipalities. Other reasons include increasing mobility, but also limited public finance. The cooperation of municipalities with the core city of Trnava should become one of the priorities of local policy, also with regard to the future.

ZOMOT associates Trnava city as the capital city of the region with the surrounding municipalities in FUA: Biely Kostol, Bohdanovce nad Trnavou, Brestovany, Bučany, Dolné Lovčice, Hrnčiarovce nad Parnou, Jaslovské Bohunice, Malženice, Šelpice, Špačince, Zavar, Zeleneč, Zvončín, Ružindol and Suchá nad Parnou. Functional Urban Area Trnava Trnava aims at deepening cooperation, creating common public policies, and providing common services to FUA residents so that an integrated environmental approach to addressing the specific needs of the area is respected.

## PILOT INVESTMENT TRNAVA ŠTRKY

The territory of the Štrky is in the north-western part of Trnava extravilan, in contact with the firing squad. The planned revitalization of the area is due to the involvement of Trnava in the project LUMAT CE89.

The territory of the Štrky is formed by the forest community, which is the rest of the original floodplain forest. For the FUA, it is a valuable place thanks to recreational-leisure potential and ecological value. The forest park needs a comprehensive revitalization because it suffers from problems such as overgrazing vegetation, invasive vegetation, landfill of waste (municipal and construction), which ultimately causes unattractive territory.

Revitalization consists of landscaping: by clearing a forest park, creating a trail network, creating a small pond, placing the furniture (benches, waste baskets, grills and the like) and the exterior architecture. The main idea of the project is to create, through the regeneration of the territory, a recreational zone in the nature, accessible to general public. As a result, there will be a key space with a social function important to communications and integration of FUA's citizens.

The vision of the forest renewal plan is that the heart of the recreational-leisure area will be a pond with aquatic plants. An interesting - inspirational activity is the creation



Figure 7: Visualisation of the view of the lake from the hill.  
(Kukurdik J., 2017)



Figure 8: Visualisation of the summerhouse with a barbecue.  
(Kukurdik J., 2017)

of a pond. It is formed by a recess, and the soil that has been excavated will be used as the base of a hill with a view of the area (sunny hill). For example, the public will be able to picnic there. A relaxation zone with benches will be built in the vicinity, and there will also be a summerhouse with a barbecue.

In addition to relaxation and sports activities, the restored forest park will offer a walk along the entire site. The trail network will lead all over the area, lead around the pond and will be away from the perimeter to the center of the forest park. In the marginal parts, an educational walkway with small eco-tracks (for insects, bird boxes, mushrooms and bats) will be conducted. The project also includes public lighting.

The objective of the revitalization of the Štrky forest park is to increase the ecological value and the stability of the area, which is a local biocentre. The planned adaptations will have a beneficial effect on this site, as they will promote the diversity of flora and fauna; an improvement in water regime and a positive impact on the microclimate of the

space is also expected. In addition to developing a green and blue infrastructure to eliminate climate changes, the success of the project is the use of area by all social groups.

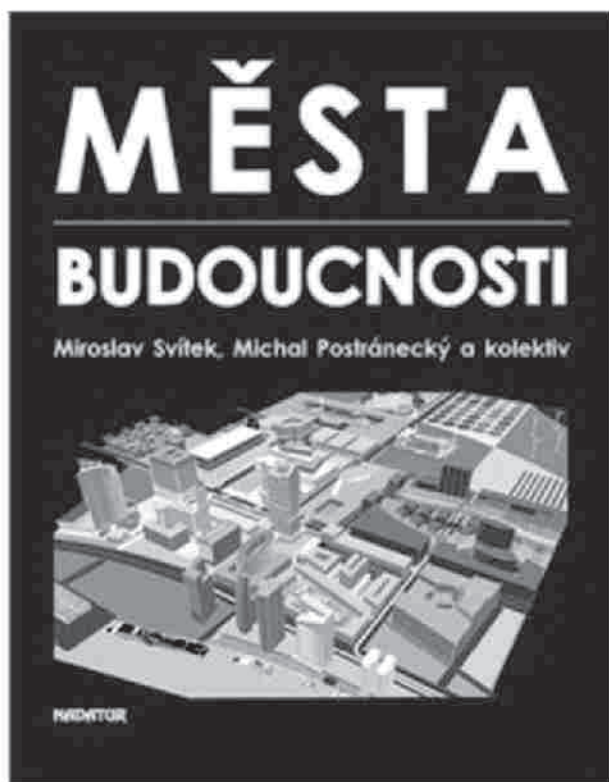
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Milan Husár

**CITIES OF THE FUTURE  
[MĚSTA BUDOUCNOSTI]**



**CITIES OF THE FUTURE  
[MĚSTA BUDOUCNOSTI]**

Michal Postránecký, Miroslav Svítek et al  
Published by: NADATUR, spol. s.r.o., Praha, 2018

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Czech language

The book is a large volume dealing with recent and highly studied and discussed topic of smart cities. It is focused both on theory of smart development as well as practical cases including numerous cities and how these approached the smart city approach. Both head authors are highly respected scholars and practitioners who spent many years working in field of urban planning. The publication is linked to activities of the Czech Smart City Cluster which is an organization connecting theory and practice and working closely with Czech municipalities and IT companies delivering smart solutions for sustainable future and growth of Czech cities.

The book consists of three parts. The first part describes cities of the future from systems view including urbanism, safety, shared economy and the ongoing fourth industrial revolution. The second part focuses on several fields of life in cities from modern administration in the municipalities through cybernetic infrastructure, energy, logistics up to intelligent buildings. The final part includes case studies from the cities of the future such as Aspern district in Vienna and provides guidelines for building smart cities including monitoring techniques and variables for sustainable and demand-driven growth of cities.

It is an open-ended book which can be updated each year with new research on smart development and case studies reflecting the evolution of the idea of smartness. It views a city as a living lab in which new approaches can be developed and tested and further used in other cities both in Czech Republic and worldwide. The discussion on smart cities began more than two decades ago and until today there is no single universally accepted definition reflecting the complexity of the issue and a number of ways to look at smart cities. The book shows that although smart city as a concept was initially aimed at large modern cities such as Hong Kong, Paris or London, it is becoming a universal approach to developing city strategies capitalizing the local resources with help of also ICT. Lately there are discussion on smart villages, so it is visible that the concept is developing and finding its objects on all scales. It is up to both private and public sector and academics to foster this discussion and remind decision makers to consider both sides of the game, not only investments into private ICT solutions for the sake of deployment technologies, but to look at it from larger scale and ask what are the needs of current cities and how these needs can be responded to in efficient and effective way. It is books like this to feed this discussion and aim at critical perspective on how our cities are growing and what kind of development we want.



Dagmar Petříková

**INTERREG CE89 LUMAT PROJECT PUBLIC CONFERENCE  
“FUTURE CHALLENGES OF LAND MANAGEMENT”  
IN SLOVENIAN CONFERENCE CENTRE BROD PRI KRANJU 25-27.09.2018**

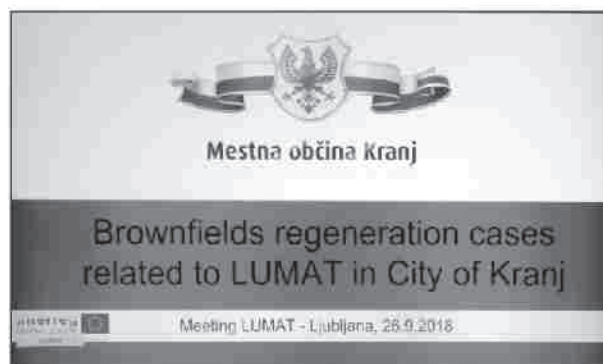


LUMAT Project Public Conference “Future Challenges of Land Management” was taking place on September 25, 2018 in the Slovenian Conference Centre in Brod pri Kranju, along with the LUMAT project meeting taking place in the Urban Planning Institute of the Republic of Slovenia (UIRS) in Ljubljana, SI on September 26-27, 2018.

The objective of the LUMAT Public Conference “Future Challenges of Land Management” was to highlight the role of integrated spatial planning and the importance of urban regeneration for the prevention of urban sprawl and reduction of land take. The expansion of built-up areas and the resulting land take have been identified as one of the key development problems in the recent programming period. Reducing the land take and reaching zero land take by 2050 are goals set both at EU and Member State level. To achieve land take targets by 2050, planning solutions must include compensation measures and introduce effective environmental management tools, already introduced in various European regions. The LUMAT project has focused on the importance of the actions taken inside FUAs (functional urban areas) and strengthening of spatial planning at regional level in seven countries of the LUMAT partnership (PL, IT, DE, SK, CZ, SI, AT), which is proven practice of many countries. In all partnership countries the focus has been on environmental management in relation to land as a resource, land management reflecting all development goals in urban area.

The conference was opened by Mr. Bostjan Trilar (Mayor of the City of Kranj, SI) and Ms. Lenča Humerca Solar (Ministry of Environment and Spatial Planning of Slovenia).

Mr. Christophe Ebermann from the Joint Secretariat of Interreg Central Europe presented the key ideas of Interreg CE under the specific objective 3.3: To improve environmental management of functional urban areas to make them more liveable places, where Interreg CE



programme, as European Union funding programme encouraging transnational cooperation in central Europe supported in the programming period 2014-2020 several projects, including the project “Implementation of Sustainable Land Use in Integrated Environmental Management of Functional Urban Areas”, acronym LUMAT.

Ms. Anna Starzewska-Sikorska from IETU Katowice, PL as lead partner of the LUMAT project presented the LUMAT project, its partnership and the pilot actions:

- „Garden show” (Austria),
- „Priority map” (Czech Republic),
- „Pilot program of site compensation” (Germany),
- „Intermunicipal management model with implementation of SDSS” (Italy),
- Investment of brownfield regeneration in city centre (Poland),
- Investment of „green brownfield” regeneration (Slovakia),
- Industrial symbiosis model application (Slovenia).

Presentations during the public conference highlighted primarily the topic „Environmental land management methods and tools used in the LUMAT project”:

- Key challenges of urban regeneration and integrative land management (Bostjan Cotič, UIRS, SI)
- Integrated site compensation in relation to brownfields and degraded areas (Pietro Elisei, Urbasofia, IT)
- Ecosystem services assessment for supporting decisions in integrated land use management (Prof. Maroš Finka, SPECTRA, SK)
- Improving the quality of life by investments in Ruda Slaska (PL) and Trnava (SK)





The conference was intended for professionals and decision makers at local and regional level. The conference went beyond presenting the achievements of the LUMAT project, it addressed the above mentioned challenges in cooperation with other experts, focusing on how to promote faster and timely regeneration and revitalisation of already built-up areas from the point of view of sustainable land use in brownfield transformation and management, promotion of eco-system services and governance tools in FUAs.

There were many practitioners participating at the conference who could see good practices and solutions, presented by LUMAT partners and invited speakers.

The conference has been very successful with active open forum discussions to the presented topics. Round tables focused on:

- How can economic development and spatial planning work together towards faster and efficient urban regeneration?
- Linking practitioners and decision makers for better governance of functional urban areas.

The LUMAT Project Steering Committee meeting and Project meeting took place on September 26-27, 2018 where the key issues of the LUMAT project tasks for its successful finalization have been discussed.



Sessions have been divided according to the work packages. In the session on W.P.T.1 "Methodology, Trainings and Common Understanding of Land Use in Integrated Environmental Management" there was discussion on local trainings – exchange of experience, training materials. The template for reporting on national trainings has been introduced and discussed.

Session on W.P.T.2 "Urban/peri Urban Action Plans, Strategies and Tools" focused on progress by the partners and results in the FUA for making more liveable places and implementing sustainable land management: tool application and adaptation, integrated environmental management structures .

In the session on W.P.T.3 "Application of integrated Environmental Land Management in FUAs" presentation of pilot actions at the current stage was going on and discussion to the proposed solutions and measures.

WP on Communication has been focused on making video and other communication issues in the LUMAT project.

WP on Management discussed financial issues, application for prolongation of the LUMAT project and preparation of the LUMAT project final conference "Towards the Integrated Environmental Land Management in Central Europe" to be held April 14-16, 2019 in Katowice, Poland.





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## ■ STUDIES:

**Maroš Finka, Vladimír Ondrejčka, Lubomír Jamečný, Zuzana Ladzińska, Micaela Scacchi**

COMMON FUNCTIONAL URBAN AREAS INTEGRATED ENVIRONMENTAL MANAGEMENT STRATEGY (FUAIEMS)

**Bernd Siemer, Karl Eckert, Uwe Ferber**

TRANSNATIONAL CONCEPT FOR ACTION PLANS IN FUAs

**Dagmar Petříková, et al.**

ACTION PLANS for INTEGRATED ENVIRONMENTAL MANAGEMENT for RUDA ŠLAŠKA FUA and TRNAVA FUA and PILOT INVESTMENTS in RUDA ŠLAŠKA and TRNAVA

## ■ REVIEW

**Milan Husár**

CITIES OF THE FUTURE [MĚSTA BUDOUCNOSTI]

## ■ UPDATE

**Dagmar Petříková**

INTERREG CE89 LUMAT PROJECT PUBLIC CONFERENCE "FUTURE CHALLENGES OF LAND MANAGEMENT" IN SLOVENIAN CONFERENCE CENTRE BROD PRI KRANJU 25-27.09.2018

