Project “Enhancement of Green Infrastructure in the Landscape of Lowland Rivers”

(ENGRAVE, LLI-291)

ENGRAVE Recommendations on enhancing integrated planning approach for deployment of green infrastructure from national to local level

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Introduction

Various societal challenges of the 21st century, including decline of biodiversity, climate change and related risks of floods and drought, pollution of water bodies, land degradation etc. calls for more sustainable land use policies and integrated, ecosystem-based planning. Integrated planning in this context means applying the trans-disciplinary approach to integrate different disciplines or sectors, to address the relationships between socio-economic and ecological systems as well as to involve stakeholders and local knowledge.

The green infrastructure (GI) is an emerging concept, which supports integration of ecological principles in land-use planning and governance. Thereby it provides suitable framework for applying the integrated planning approach and addressing the various societal challenges.

The EU Green Infrastructure Strategy[1] defines GI as "*strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services.*" The definition highlights the main aspects characterising GI: i) maintenance of the network of natural and semi-natural areas; ii) multifunctionality – delivery of wide range of ecosystem services essential for human well-being; as well as iii) strategic and integrative planning at different levels.

Latvian-Lithuanian cross-border cooperation project „Enhancement of Green Infrastructure in the Landscape of Lowland Rivers" (acronym – ENGRAVE) aimed to enhance river-based green infrastructure by integrating ecosystem and landscape concepts into the planning and management of the lowland rivers at local and regional scale. This has been achieved through active collaboration between planning authorities, researchers, and local stakeholders. The project results include planning cases at different levels as well as practical measures for green infrastructure improvement.

These recommendations collate the main findings of the project and suggests a way forward to integrated planning approach for enhancement of green and blue infrastructure in both countries from local to national level. The recommendations are targeted to local municipalities as well as national competent authorities, including different departments of ministries in charge for environmental and land use policies and planning.

The recommendations are based on the conceptual framework for integrating green infrastructure and landscape planning, developed by the ENGRAVE project[2], results and experience gained from the ENGRAVE cases on GI & landscape planning as well as input from stakeholders collected during ENGRAVE events and other fora. The ENGRAVE project has organised four stakeholder panel discussions, involving representatives from ministries, nature conservation and regional planning authorities, local municipalities, landscape and spatial planning experts for discussing the ENGRAVE approach and case studies as well as opportunities and challenges for applying integrated planning and green infrastructure concepts in practice. Furthermore, the integration of the GI concept into existing planning system at different levels was discussed at the Latvian expert workshop on landscape planning, held in December 2019 in Riga, as well as during consultations with key experts and competent authorities from Lithuania during April 2020. We thank all stakeholders for their contributions and cooperation!

[1] European Commission (2013). Green infrastructure (GI) – Enhancing Europe's Natural Capital. COM (2013)249.
[2] Ruskule A., Veidemane K., Prižavoite D. 2018. Methodology for Regional and Local Landscape and Green Infrastructure Planning in Lowland Areas, ENGRAVE project report. Baltic Environmental Forum-Latvia, Available at : http://lielupe.balticrivers.eu/en/engrave-project

"State -of -art" in Green Infrastructure planning

The GI concept was brough up on the EU policy agenda with adoption of the EU Biodiversity Strategy 2020 in 2011. Its Target 2 requires that "by 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems". To support implementation of this target, the EC has adopted in 2013 an EU-wide strategy promoting investments in green infrastructure. The strategy encourages the deployment of GI across Europe as well as the development of a Trans-European Network for Green Infrastructure in Europe, a so-called TEN-G. It also calls for GI becoming a standard part of spatial planning and territorial development as well as full integration into the policies whose objectives can be achieved as a whole or in part through nature-based solutions.

The GI concept first has become popular in the urban context, where it refers to patchwork of parks, gardens, and other green areas, providing habitats and various ecosystem services (e.g. cleaner air, rainwater retention, flood protection, recreation etc.). At the same time, it is gaining importance for sustainable development of rural areas where the GI is formed by patches and corridors of natural and semi-natural areas formed by rivers, floodplains, woodlands, wetlands, and semi-natural grasslands. Following the objectives set by the EU biodiversity policy, several initiatives on GI mapping and strategic planning have been launched, ranging from local scale projects up to EU level studies. A report from the EC "Review of progress on implementation of the EU green infrastructure strategy"[3] and the Commission Staff Working Document, accompanying it,[4] reflects on the achieved progress and challenges encountered with regard to mainstreaming of GI in other EU policies as well as highlights several best practice examples of GI deployment at different planning contexts and scales.

In May 2019 the EC has published a "Guidance on a strategic framework for further supporting the deployment of EU-level green and blue infrastructure"[5], aiming to encourage scaling-up of investments in GI and stimulating a more strategic and integrated approach to deployment of GI at EU level. It provides criteria to identify EU-level green and blue infrastructure projects as well as describes the relevant EU supporting tools and instruments. The deployment of EU-level green infrastructure has becoming increasingly important also in relation to the most recent EU policy developments, including the European Green Deal[6] and upcoming new EU Biodiversity Strategy. The EU funds for the next period from 2021-2027 in the filed of environment and climate change will have a strong focus on investments in GI.

Latvia and Lithuania still have very little experience in applying GI concept in policy making and spatial planning. While there are some small scale initiatives in Vilnius, Riga and other bigger cities and towns for improvement of the urban green space, its accessibility and connectivity as well as delivery of ecosystem services, a comprehensive approach (or vision) for a applying the GI concept in spatial planning and land use policy/decision making is not yet in place. Thus, the ENGRAVE project can be considered as one of the first attempts for testing the integrated planning approaches for enhance river-based green infrastructure

[3] COM(2019) 236 final, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019DC0236&qid=1562053537296

[4] COM (2019) 236 final, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019SC0184&qid=1562054969676&from=EN

[5] EC, 2019. Guidance on a strategic framework for further supporting the deployment of EU-level green and blue infrastructure. Available at https://ec.europa.eu/environment/nature/ecosystems/index_en.htm

[6] COM(2019) 640 final, https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf

and promoting of the GI concept among planners, local and regional authorities as well as national policy makers.

The main obstacles for uptake of the concept in the both counties are related to lack of knowledge and capacities among the relevant experts and policy makers from national to local level. Moreover, expert discussion in Latvia and Lithuania (as well as survey carried out by the Lithuanian Ministry of Environment in 2019) reveals conceptual challenges with regard to interpretation of the GI concept as well as linking it to the existing systems and theoretical frameworks for nature conservation and spatial planning. For example, Lithuania has well established experience with implementing the concept of ecological networks, which was applied for development of so called 'Nature Frame' (covering ca. 60 % of the countries area) and served as basis for the network of protected areas[7]. Although the Nature Frame has a good potential for enhancing ecological connectivity and ecosystem condition, experts are still debating, if it can be integrated within the GI network or vice versa.

At the same time, both countries are in good progress in developing the knowledge base and data on ecosystem service supply (e.g. LIFE Viva Grass project, implemented in Lithuania, Latvia and Estonia; LINESAM project in Lithuania; LIFE Ecosystem Services in Latvia), which provides essential input for assessment of the existing GI and identifying the needs for its enhancement. Also, the existing spatial planning systems of both countries can provide good opportunities for integration of the GI concept at different levels.

ENGRAVE approach and experience in testing of integrated landscape and green infrastructure planning

The ENGRAVE project has tested an integrated approach to landscape and green infrastructure planning and enhancement. This approach entails that landscape and its forming elements (e.g. river, its valley as well as surrounding land use and cultural heritage) forms the basis for the green infrastructure and ecosystem service supply and related benefits to society, including good environmental quality and healthy living conditions, possibilities for tourism and recreation and related income and economic viability of the area. The analysis of landscape structure and assessment of its ecological value, connectivity and ecosystem service supply of different land cover types can help in mapping of GI as well as identification of risk areas or conflict between existing land use and optimum ecosystem service supply, where measure for GI enhancement shall be applied.

The methodology developed by the ENGRAVE project suggests the following steps for integrated GI and landscape planning[8]:

1. **Mapping and assessment of existing GI:**
   - selection of criteria for assessment of the ecological and landscape value, relevant indicators, and data sets for assessment,
   - selection of GI related ecosystem services, indicators and data sets for assessment,
   - producing single ecological and landscape value maps and single ecosystem service maps,
   - producing aggregated maps, which summarize the ecological, landscape and/or ecosystem service value (e.g. 'hot & cold' spot analysis of ecosystem service supply),

[7] Kavaliauskas, P., 1995. The nature frame: Lithuanian experience. Landschap 12 (3), 17–26.

[8] Ruskule A., Veidemane K., Prižavoite D. 2018. Methodology for Regional and Local Landscape and Green Infrastructure Planning in Lowland Areas, ENGRAVE project report. Baltic Environmental Forum-Latvia, Available at : http://lielupe.balticrivers.eu/en/engrave-project

- identification of the areas forming GI.

2. **Assessment of GI condition:**
   - analysis of the condition of the existing GI and its capacity to supply ecosystem services,
   - apprising of the societal challenges related to insufficient environmental quality or risks as well as inadequate ecosystem service supply,
   - identification of areas with insufficient GI for addressing the societal challenges.

3. **Planning solutions and measures for improvement of GI:**
   - identification of the locations for GI improvement, where the implementation of the measures/nature-based solutions would bring the maximum benefit to society,
   - assessment of the impacts of the proposed solutions/scenario on landscape structure, connectivity of GI and ecosystem service supply,
   - involvement of local stakeholders in development/ prioritisation of the proposed solutions and discussing their likely impacts and implementation possibilities.

The integrated approach to GI and landscape planning was tested by the ENGRAVE project at different levels and contexts.

The regional level was addressed by the planning case on development of the GI and landscape **thematic plan for the Zemgale planning region** in Latvia (English summary). The plan includes most of the steps for integrated GI and landscape planning described above. The landscape characterisation and ecosystem service mapping were carried out for the whole Zemgale planning region. The ecosystem service 'hot & cold' spot analysis revealed Zemgale plain as the area with lowest ecosystem service supply and insufficient green infrastructure. Therefore, detailed GI mapping, defining of landscape quality objectives and priority actions for landscape and GI enhancement covers the Zemgale plain landscape region. The plan also highlights the linkage between landscape quality objectives and improvement of green infrastructure.

The local level was addressed in the **thematic plan for river valley landscape and GI in Bauska town in Latvia** (including graphical part, English summary). The plan assesses aesthetic and ecological quality as well as functionality of the existing GI and river landscape in Bauska town. It offers solutions for preserving nature and cultural heritage, improving public access to riverbanks and diversification of recreational opportunities as well as provides guidelines for landscape and GI governance and management. Having local character, the plan also contains recommendations on forming of visual identify and detailed solutions for landscaping elements in Bauska town.

The detailed planning for improvement of the urban GI was implemented also at the **riverbanks of Apaščia & Agluona in Biržai town and the Lake Širvena in Biržai district in Lithuania**. This plan provides more conventional approach to landscaping of public green spaces with focus on enhancement of recreational opportunities, which nevertheless represents essential function of the GI.

The study on revitalisation of the Svēte river in Jelgava municipality, Latvia involved novel methods for generating the high-resolution data (e.g. using LIDAR data for mapping of the river flood plain and development of the 3D model of the river bed, monitoring of water level and run-off, producing pollution leaching and coastal erosion maps), which will be used by the upcoming projects of the Svēte river revitalisation and GI enhancement.

Opportunities for integration of GI concepts into existing policies and planning systems and practical implementation

Implementation of the integrated approach for deployment of green infrastructure requires strategic and integrated planning solutions from national to local level. This allows scaling up of local GI initiatives to a higher level, ensuring connectivity and more effective functioning of the GI network, contributing to deployment of EU-level GI infrastructure.

Such integrative and strategic planning can be achieved in Latvia and Lithuania through the existing policies and land use planning systems at different levels. The national level policies/planning documents are important for providing strategic perspective and stimulating initiation of GI planning at local and regional level, while the planning and implementation of the practical GI enhancement measures are more effective at local (municipality) level. At the same time, it is essential to ensure consistency between different policies and planning levels.

Higher level (e.g. regional) planning documents can include assessment of the GI condition and connectivity and provide a guidance for local/municipality planning on measures for enhancement of GI. For example, in Latvia there is a possibility to develop thematic plans on regional level, which can be used for assessment of GI and strategic guidance of GI enhancement (e.g. the thematic plan on GI and landscapes of Zemgale Planning region demonstrates an innovative approach and methods in the field which can be replicated in other parts of both countries). The regional level is not applied In Lithuanian spatial planning system (spatial plans are developed for national and municipality level), though the GI planning at regional level can be addressed through river basin management plans as well as management of regional parks.

Local level initiatives/projects are essential for demonstration of practical measures (i.e. nature-based solutions) for GI enhancement. As the GI enhancement measures still have innovative and experimental character, the costs of implementation might be higher compared to routine landscaping and design works. Therefore, the pilot projects shall be run to test the cost effectiveness.

Based on discussions with stakeholders at the ENGRAVE project meetings and other fora, the opportunities for implementation of the GI concept through existing policies, planning system and practical measures at different levels were identified (see the table below).

Integration of GI into existing policies and systen for addressing land use planning	Practical measures for GI enhancement
National level	
• Objectives for enhancement of GI shall be highlighted in the national policy documents for: - protection of biodiversity - landscape planning - rural development - climate change mitigation& adaptation, etc • Guidelines for local authorities on planning investments in GI • Guidelines for planners on integration of the GI concept into existing planning systems, e.g. spatial planning, landscape planning, nature conservation, river basin management	• Introducing of agro-environmental schemes supporting enhancement of GI, e.g.: - establishment and maintenance of different width and type of buffer stripes along water bodies, - restoration of permanent grasslands, floodplains, wetlands etc. as well as support the maintaining the quality of seminatural open landscapes, - co-operation schemes of management of GI elements to ensure connectivity and efficient use of the areas. • Catalogue of good practice in GI enhancement measures

	• Information/awareness raising of competent authorities & decision makers, landowners and managers
Regional level	
• Guidelines for municipalities on how to ensure integrity of the GI at regional scale • Thematic planning documents, assessing GI & landscapes at regional level and identifying areas where enhancement measures are required • Integration of the GI concept into River basin management plans, management plans for protected areas and other planning documents	• Projects for enhancing connectivity of protected areas & GI • Projects for restoration and management of GI in river valleys • Studies on existing GI and recreation potential • Education and training for municipality planners • Marketing of the regional 'nature based' products and services
Municipality level	
• Thematic planning documents on enhancement of GI to provide guidance or/and special provisions for spatial planning documents • Applying of GI perspective in development strategy, programme and spatial plans – to support maintenance of green space and improving tourism infrastructure as well as investments in GI	• Projects for restoration/ revitalisation of river ecosystems • Projects for improvement of the public green space and infrastructure • Landscaping projects • Education of local people about GI, landscape values & nature friendly land use practices
Local (site) level	
• Local/detailed plans to specify spatial solution for enhancement or establishment of the GI elements or in case changes of the land use zoning is required	• Habitat restoration and landscaping projects • Pilot projects on demonstration of innovative nature-based solutions for improving water retention, reducing of nutrient run-off, etc. (e.g. restoration of hydrological regime of rivers within areas of low economic profitability) • Implementation of agro-environmental and cooperation schemes for maintenance of GI (e.g. maintenance of floodplains, wetlands, semi-natural grasslands; introducing nature friendly drainage systems etc.)

For more information and examples of GI planning solutions and practical enhancement measures, please, read ENGRAVE brochure on "Green infrastructure of lowland rivers for safeguarding nature and human well-being".

Conclusions

- GI is a novel concept for Latvia and Lithuania with good potential to support integration of the ecological principles into land use planning, thus enhancing the connectivity and condition of the network of semi-natural areas, maintenance of biodiversity as well as addressing various environmental challenges (climate change, flood risk, eutrophication of the water bodies etc.) essential for human well-being.
- Integrated, strategic planning solutions from national to local level are required for deployment of the GI and ensuring its functionality & connectivity.
- The existing land use planning and nature conservation systems in Latvia and Lithuania provide good opportunities for operationalisation of the GI concept. GI planning can be implemented through existing planning practices (e.g. spatial planning, nature conservation, river basin management and landscape planning).
- Landscape planning provides a good framework for implementation of the GI concept. Example of the thematic plan on landscape and GI for Zemgale Planning Region, developed within the ENGRAVE project, demonstrates that most of the landscape qualities, addressed in the plan, are directly related to GI.
- The GI has a multifunctional role in addressing different societal challenges and aspects of human well-being, therefore GI planning requires integrated approach and involvement of various experts, including ecologists, hydrologists, landscape experts and architects, cultural heritage experts etc.
- Awareness raising and education of different stakeholders on GI and ecosystem services is very essential to achieve the objectives of various environmental and nature conservation policies. ENGRAVE project experience shows interest from stakeholders in practical measures/solutions for GI enhancement as well as costs and benefits for implementation of such activities.
- Knowledge building & training is required on strategic approaches as well as practical solutions and best practice examples of GI enhancement. The capacity building activities shall include site visits and outdoor session within and outside region and countries. The active form of learning has been evaluated as most effective.
- Active engagement of stakeholders in GI planning and enhancement activities is required for achieving the best results. Local knowledge is essential for development of the most suitable solutions for GI improvement and maintenance. Participation of the local stakeholders, e.g. farmers, producers of local products, tourism service providers etc. in GI planning would increase the awareness, feeling of ownership and sustainability of the applied measures.