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Project of Cross-border Cooperation Programme 2014-2020 “Sticky urban areas”

TERRITORY PLANNING AND INTEGRATED NATURAL RESOURCE MANAGEMENT

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LATVIA UNIVERSITY OF LIFE SCIENCES AND TECHNOLOGIES

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Project of Cross-border Cooperation Programme 2014-2020 ‘‘Sticky urban areas’’

Latvia University
of Life Sciences
and Technologies

JELGAVA, 2022

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The developed guidelines are intended to be informative, methodological and educational material on integrated planning and management of natural resources in urban environments, including both theoretical insights and practical examples.
The material consists of three main thematic sections. The first section includes a strategic and theoretical framework, describing the main insights on natural resources in urban environments, urban ecology and strategic documents involving integrated planning and management of natural resources. The second section looks at the main methodological approaches and concepts, while the third section summarises the existing tools related to integrated planning and management of natural resources.

The layout of the material is as follows: the basis is general information on the topic, supplemented with the main findings highlighted in the color corresponding to the chapter and with examples from practice marked in gray background.

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AUTHORS' FOREWORD

Towards sustainable urban and rural environment – integrated planning and management of natural resources

Today, we are increasingly faced with challenges that are determined by the interaction and harmonious coexistence of the man-made environment and nature. The impacts of climate change, biodiversity and natural resource loss are prompting new approaches and solutions in spatial planning and management, aimed at sustainable and flexible spatial development. All these aspects are highlighted in a number of international strategies of relevance today, such as the UN General Assembly resolution of 25 September 2015 "Transforming Our World: the 2030 Agenda for Sustainable Development". It is the first global document to provide for universal and comprehensive action. This resolution set out 17 sustainable development goals, which include economic, social and environmental aspects. Also, the principles of sustainable development and the green economy are included in a number of other international strategies, such as the European Green Deal. These initiatives are also related to the provision of biodiversity, ecosystem services, development of climate-smart solutions (EU Biodiversity Strategy; EU Green Infrastructure Strategy, etc.).

One approach is integrated planning and management of natural resources. It is especially important in urban environments, where buildings predominate and space is needed for the construction of streets and infrastructure development. At the same time, the quality of the environment must be ensured, health must be promoted, and the population must be provided with opportunities for activities in nature. People have learned from nature since ancient times, studying it, and even today the use of natural materials in public open space and facilities, such as children's playgrounds, is becoming more and more important. Nature territories can also become a source of cognition and a means of education for various groups of the population. The planning and management of integrated natural resources in nature territories is mainly related to the protection of natural treasures of these territories and the development of an appropriate infrastructure, and if this infrastructure is made educational and interesting it also provides an opportunity to educate the public about nature's treasures.

However, it is only through cooperation between the various stakeholders – local authorities, scientific institutions and society at large – that long-term sustainable solutions can be achieved. This handbook has also benefited from the involvement of experts from various fields, both local authorities and scientific institutions. This has provided a broader perspective on the opportunities, challenges and possible solutions for integrated planning and management of natural resources in the urban environment.

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SUSTAINABLE AND GREEN DEVELOPMENT OBJECTIVES AND STRATEGIES IN THE CONTEXT OF SPATIAL PLANNING

Daiga Skujāne

The importance of natural resources to our daily lives and the quality of our living environment is no longer a matter of debate. This is also confirmed by the political commitment of European countries and societies to think and act sustainably and greenly, which is reflected in a number of current strategies, such as the UN General Assembly resolution of 25 September 2015 "Transforming Our World: the 2030 Agenda for Sustainable Development". It is the first global document to provide for universal and comprehensive action. The resolution sets out 17 sustainable development goals, covering economic, social and environmental aspects, which are closely linked to integrated natural resource management in the context of spatial planning and sustainable development.

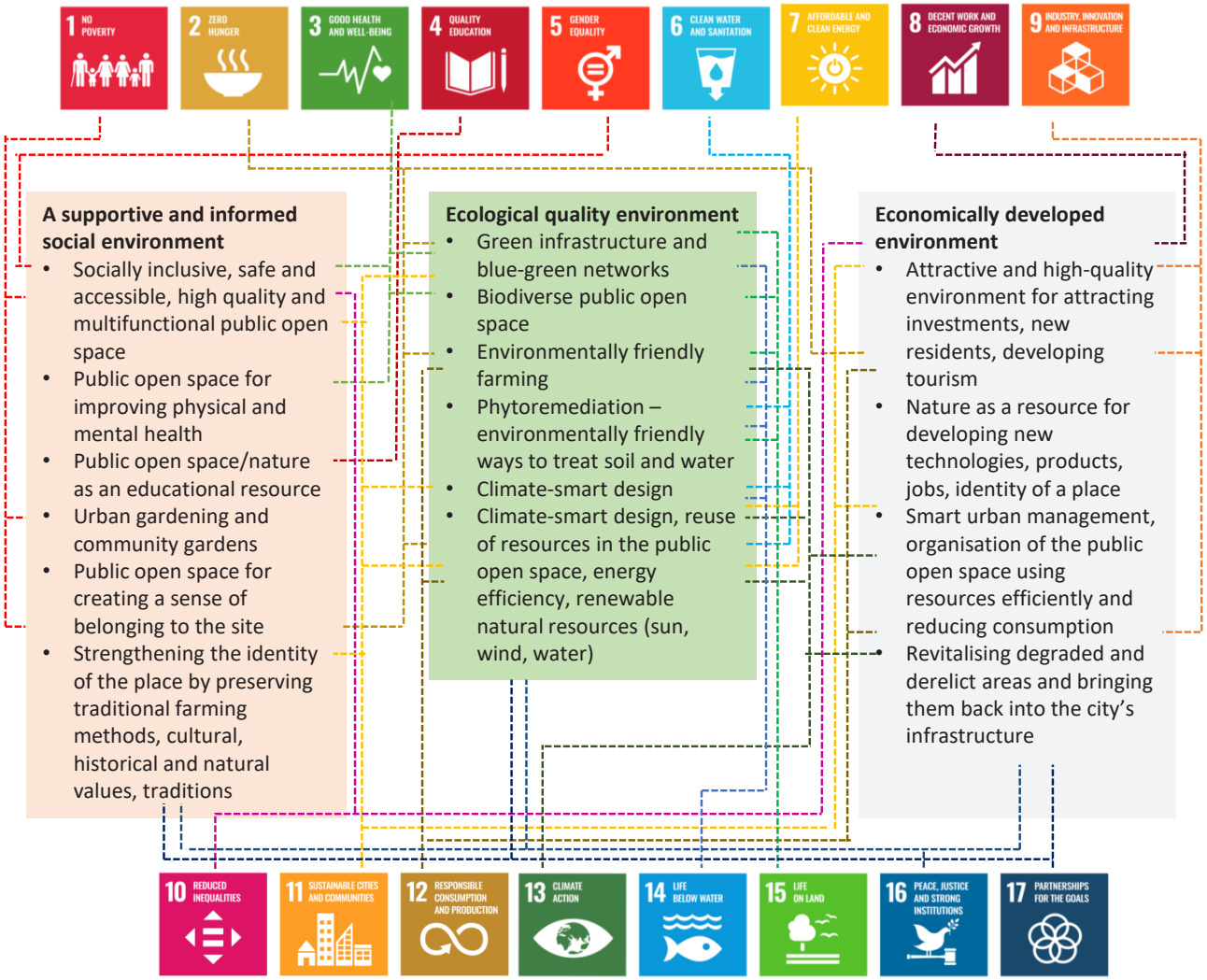

Figure 1. Linking the 17 sustainable development goals to integrated natural resource management in the context of spatial planning and sustainable development (made by authors on Ilgtspējīgas attīstības ..., 2015)

The principles of sustainable development and the green economy are also included in a number of other international strategies, such as the European Green Deal(European Green Deal). These initiatives are also related to the provision of biodiversity, ecosystem services, development of climate-smart solutions, which are included in the EU Strategy on Adaptation to Climate Change, EU Biodiversity Strategy, EU Green Infrastructure Strategy, Strategy for Achieving Climate Neutrality etc. Integrated planning and management of natural resources is closely linked to conservation, highlighting and smart management of each of the values of landscape. It is therefore bound by the European Landscape

Convention, which aims to identify, preserve and transmit to future generations the special character of each country's landscapes and to realise everyone's right to a quality living environment and landscape.

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URBAN ECOLOGY IN THE CONTEXT OF NATURAL RESOURCES AND MAIN RISKS

Daiga Skujāne and Inga Grīnfelde

The urban environment changes the natural environment. By building and designing territories according to people's daily needs and perceptions of their living environment, the terrain, the natural course of small rivers and the quality of air, water, soil and vegetation are altered. So the natural processes that occur in nature are disrupted and altered in the urban environment. In addition, we are increasingly facing the effects of climate change – longer droughts, more intense and higher precipitation events.

This calls for climate-smart solutions, in parallel with the need to work on urban models that do not have the same environmental impact as today's cities.

Figure 2. Environmental problems caused by cities and impacts on human health (made by authors on Ilgtspējīgas attīstības ..., 2015)

URBAN MICROCLIMATE

The urban environment is dominated by more buildings and hard, impermeable surfaces compared to green structures – urban forests, parks and other larger green areas. Sunlight penetrating dense buildings is repeatedly reflected, which increases the amount of solar radiation received. Consequently, heat from the sun, as well as from inefficient buildings and flue gases affects the average air temperature in the city, which is 1–2 °C higher than in rural areas. In windless, hot weather, urban microclimates tend to become unpleasantly sultry. This is exacerbated by minimal vegetation, lack of water bodies and rapid rainwater runoff into underground water collection systems. Smog and heat islands can be observed in major cities, which are caused by impaired air circulation and high emissions. Large-scale building masses, narrow spaces between buildings and inappropriately sited buildings also affect wind flows, increasing their intensity or diverting them. Draught and whirlwind occurs, creating an unpleasant microclimate. Flood risks are also contributed to by high soil compaction, which prevents water infiltration into the ground and increases the rate of runoff over the pavement/ground surface.

The solution to improving the city's microclimate is to apply the principles of eco-construction, starting with the layout of the city's overall infrastructure and the form of the built environment in accordance with the sun's path, the topography of the site and the specifics of the local climate, through to the use of environmentally friendly materials and citizen participation in site creation.

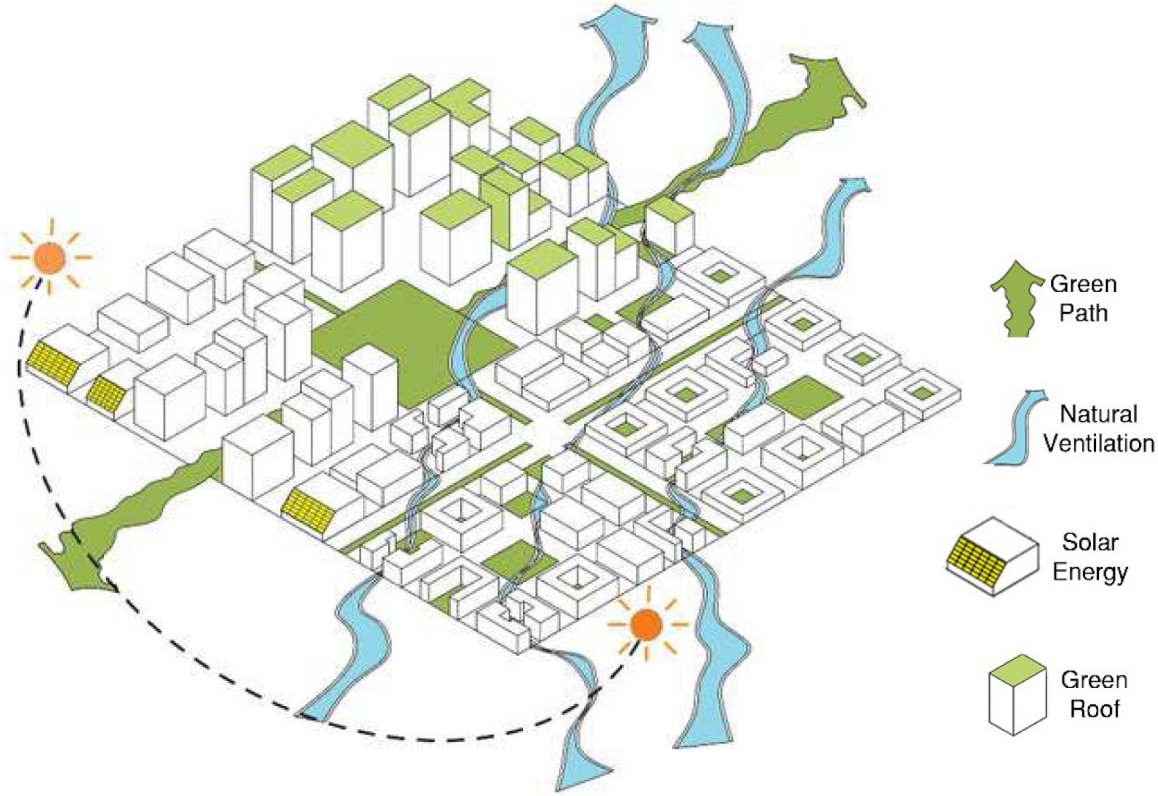

Figure 3. A conceptual model for the design of urban infrastructure and built environment according to site conditions (Urban Climate Lab, 2016)

THE PSYCHO-EMOTIONAL STATE, MENTAL AND PHYSICAL HEALTH OF THE POPULATION

The urban environment is a man-made environment, while the origins of man are to be found in nature, which includes an emotional connection to natural elements, their scale, colour, shape, sounds, smells, climatic conditions and natural processes. Artificial environments therefore often have a negative impact on mental health, for example, daily living among large-scale building masses that are out of scale with human perception may cause one to feel unsafe and depressed. Similarly, noise and the rush of everyday life can affect mental health.

To reduce the impact of urban structures on people's mental health and well-being, urban public open space should use elements that smooth large-scale structures and create a human-scale open space. Public open space should also be multifunctional, with natural structures and elements to provide opportunities for people to exercise or relax in nature within easy reach.

Figure 4. In urban environments with strong and dense high-rise buildings, greenery and elements made to the scale of a human's perception help reduce the depressive and insecure feeling created by large-scale urban structures and other elements. An example from Switzerland, Zurich MFO Park. (photo by authors)

Figure 5. Providing opportunities for sporting activities in an urban environment, complemented by the enjoyment of nature, helps maintain good mental and physical health. (Photo: A. Lūkins)

POLLUTION AND WASTE

Several types of pollution can be observed in a city – air, soil and water pollution, acoustic pollution, visual pollution. Household waste and sewage are among the sources of pollution in urban areas. In some cases, pollution can also be caused by industrial and technical facilities in the city, but such pollution is more likely to be accidental. Petroleum products and various chemicals from cars are also often released into the environment, polluting soil and water.

The solution is to create pollution-absorbing urban elements, such as greenery along streets and near squares, using appropriate plants that can take up and absorb pollutants. Car fumes and noise pose significant health risks to residents and visitors, so noise reduction through greenery, terrain elements or noise barriers is essential.

Air pollution also affects the choice of plants for urban greenery, which should be designed with species and varieties suitable for urban conditions. Plants that are inappropriately selected and inadequate in urban settings will be of poorer quality, often have smaller leaves, they will turn yellow and dry out more quickly, and the circulation of water from the roots to the leaves and vice versa will be impaired by pollution. Conifers are less suited to urban environments than deciduous trees, so their use is mainly planned in larger park areas, suburban forests.

Degraded and unused sites can also become a source of chemical and visual pollution. Abandoned industrial sites often contain soil contamination and life-threatening, derelict buildings. Abandoned sites often contribute to a criminogenic and socially irresponsible environment, posing a threat to the surrounding population.

Revitalising abandoned and degraded areas is essential, bringing them back into the socio-economic urban mainstream and reducing pollution in them, thereby creating a positive image and multifunctional use of such sites.

Figure 6. Degraded former factory sites often contain pollution, which can be mitigated in the long term by phytoremediation plantings that absorb and distribute the pollution. An example is the landscape park in Duisburg, Germany, where a multifunctional area has been created on the site of a former factory, while preserving elements that contribute to the identity of the place, such as technical elements or structures from the former factory. The bottom part of the picture shows phytoremediation plantings to clean the soil from pollution (photo by authors)

Figure 7. Former industrial sites can be developed as multifunctional public open spaces, preserving the biodiverse green structure created during the years of abandonment, and complementing it with recreational and artistic environments. Example from Germany, Schöneberger Südgelände Park (photo by authors)

PLANT COMMUNITIES, INVASIVE SPECIES THAT ARE INAPPROPRIATE FOR THE REGION AND SITE

Entirely new plant communities are emerging in urban environments, mainly influenced by planting traditions and plant choices, which are often dominated by ornamental and urban plant species and varieties that often have no ecological link to the site. In some cases, it can also have negative impacts on local flora and fauna. For example, the Japanese Rose (rosa rugosa), which is undemanding and able to put down roots quickly, was once often used to fortify sand dunes. It is the fast-growing and dispersal ability of these roses that can have a significant impact on sensitive native plant communities that are restricted to sand dune areas.

City dwellers can introduce invasive plant seeds into natural ecosystems with their shoes when they go to suburban natural areas for recreation. Seeds can also be spread by wind or watercourses from private gardens, which also grow plants that are not native to a particular region or location. This means that we often find plant species in peri-urban natural areas that are not typical of natural ecosystems.

A solution would be to educate the population, encouraging them to choose site-specific plants for their areas. Similarly, in urban green spaces, especially near existing natural areas, it is recommended to use plant species that are ecologically compatible with the place and region. Such planting would thus contribute to biodiversity without endangering native species and reduce maintenance costs by being more resilient to site-specific conditions.

Studies show that people generally accept natural green spaces, including biologically valuable grasslands (meadows) in urban areas, but their location should be planned in areas where there is less activity (urban periphery, unused parts of parks, etc.) or where intensive lawn maintenance is difficult (roadsides, slopes, river banks, etc.).

Figure 8, 9. Meadows of perennial flowering plants and grasses contribute to urban biodiversity, reduce CO2 emissions and management costs, and create a more welcoming and diverse urban public open space. Pictured left is a meadow outside a new housing block in Sheffield (photo: Matt Hall, A-I-A Studio), and pictured left is a meadow in Queen Elizabeth Olympic Park, London, UK (photo: Pictorial meadows) (Powden, 2020)

URBAN HYDROLOGICAL REGIME, FLOOD RISKS FROM RIVERS AND RAINWATER

At a local scale, the amount of water and the rate at which it circulates through the different phases of the hydrological cycle are directly influenced by factors such as vegetation, topography, temperature, land use and geological composition. In urban areas, the natural hydrological regime is altered for a number of reasons, leading to various environmental problems. The main reason is the high proportion of impermeable surfaces (buildings, pavements and highly compacted soils), which prevents the natural water cycle that occurs in nature – rainwater naturally infiltrating into the soil or being absorbed by plants and then evaporating and transpiring into the air. The proportion of impermeable surfaces in residential areas is up to 50%, but in industrial areas it can reach 70% to 80%. Paved areas cannot be defined as fully impermeable, as between 30% and 40% of rainfall infiltrates into these areas.

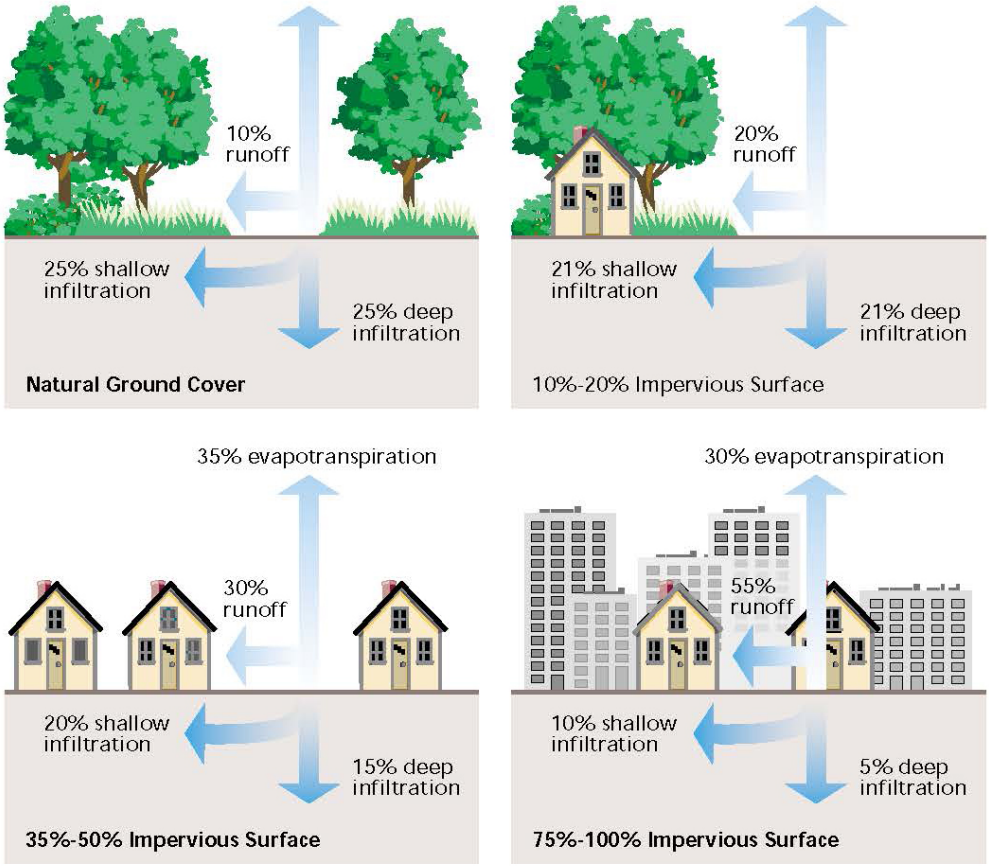

Figure 10. Changes in the water cycle due to urbanisation (Stream Corridor Restoration ..., 1998)

Water retention in natural environments ranges from 0.5 mm to 15 mm, while for impermeable surfaces water retention decreases and ranges from 0.2 mm to 3.2 mm. At low rainfall intensities, water retention is noticeable, but becomes insignificant as the intensity increases. In urban areas, water is relatively distant from the hydrological processes of a natural catchment. Humans are changing the natural ecosystem not only at the surface, but also in deeper layers. Cities have evolved over several centuries, with new buildings built on top of ancient foundations, with the top few metres of the foundations being a heterogeneous subsoil buried in concrete or stone formations with various openings.

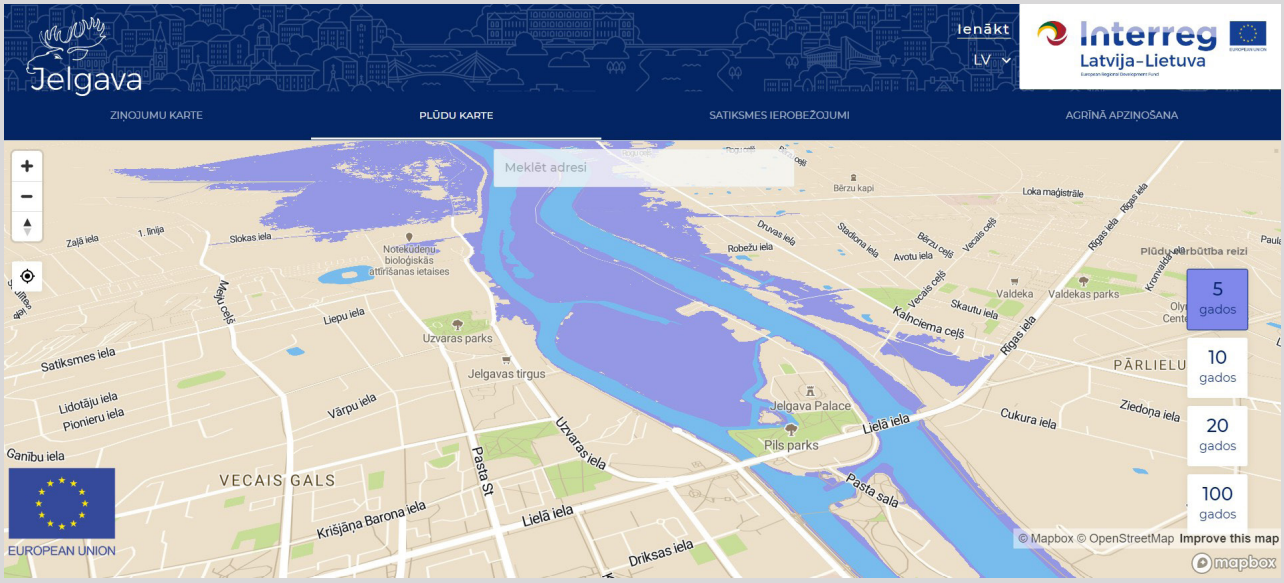

Figure 11. The activities of Jelgava Municipality Operational Information Centre include the maintenance of an information platform, where everyone can not only report problematic situations in the city, get up-to-date information on traffic restrictions, but also consult the flood map (Jelgava interactive flood ...)

Urban development causes erosion in the catchment area and imbalances in rainwater channels, which is why urban flooding is so common. New engineering works such as buildings, paving and asphalting, are being created in settlements. For this purpose, the natural cover is removed, which contributes to changes in water permeability. Building activities reduce water infiltration, leading to a strong increase in rainwater runoff. In a natural environment, as the flow rate changes, the bed naturally adapts to the new conditions. In urban catchments, channels are created artificially, such as collector systems and concrete channels. The above bed modifications limit the channel's ability to adapt to the flow, resulting in increased frequency and volume of flooding.

In the context of sustainable water management, the key variables are evaporation, precipitation, surface runoff and groundwater flow, which need to be maintained and, with the natural environment changing, the missing activity needs to be compensated for. It is therefore very important to reduce surface runoff in urban areas, which is much higher than in the natural environment due to impermeable surfaces and built-up areas. Surface runoff increases in built-up areas, requiring the construction of rainwater runoff and/or drainage systems. To minimise the amount of water that is discharged, green infrastructure and the ability of plants to take up water and release it back into the atmosphere must be used.

Plants have a very important influence on the hydrological cycle, as the roots of the plant take up water that has entered the top layer of soil. This upper part of the soil can hold a limited amount of water, known as the field capacity. Transpiration takes place in plants, so water that has infiltrated the soil evaporates through the plant leaves and is released back into the atmosphere.

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NATURAL RESOURCES INVOLVED IN SPATIAL PLANNING AND THEIR ECOLOGICAL, ECONOMIC AND SOCIAL ROLE

Daiga Skujāne

What natural resources are involved in spatial planning, and how? And what do integrated planning and management of natural resources involve?

Integrated planning and management of natural resources include plans, actions and processes, as well as methodological approaches, aimed at the efficient, versatile and sustainable use of natural resources for the creation of an ecologically, economically and socially high quality open space for living, working and recreating.

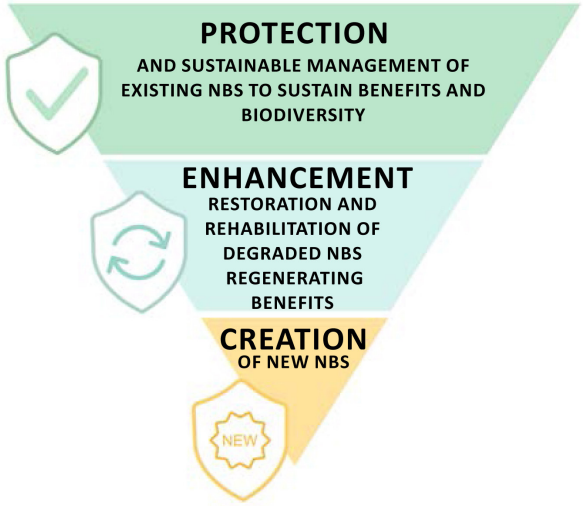

Figure 12. Key processes in sustainable planning and management of natural resources (A Catalogue of Nature..., 2021)

Integrated natural resource planning and management involves not only the development of new natural resources, but also the sustainable use and management of existing ones, preserving their values, restoring degraded natural resources and improving the ecological, functional and social quality of a place.

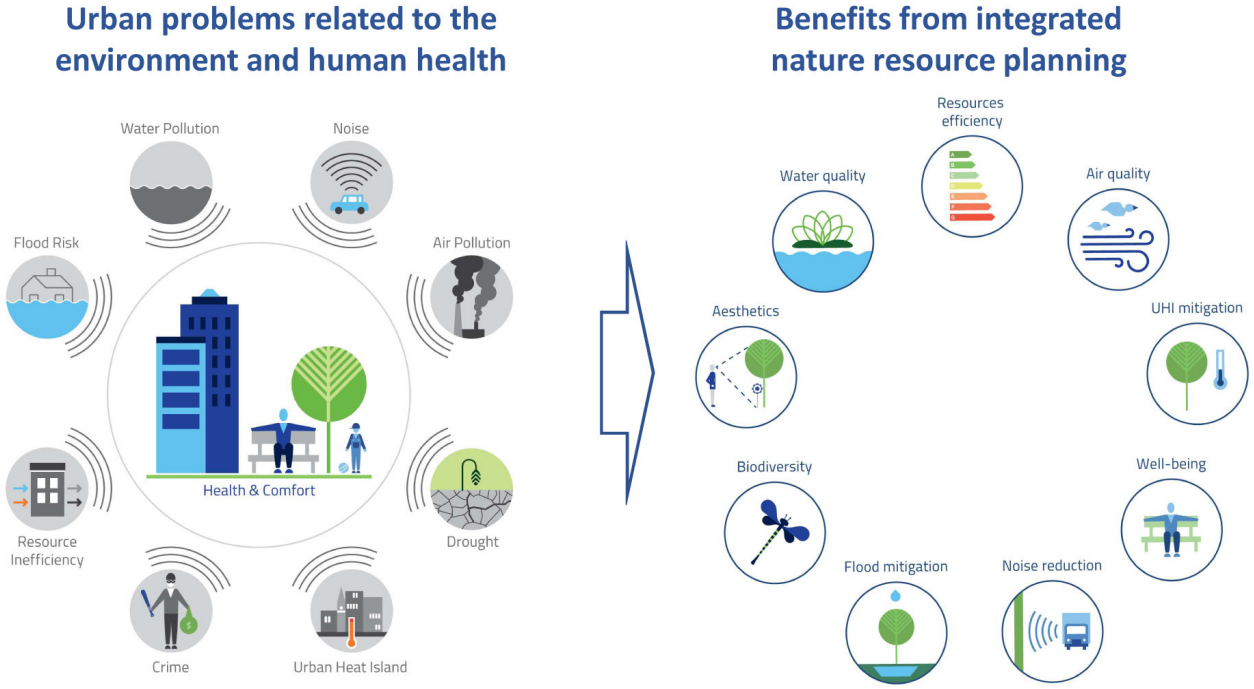

Figure 13. Key contemporary urban challenges and the role of integrated natural resource planning in addressing them (made on Blue Green Solutions, 2017)

The involvement of natural resources in spatial planning plays an important ecological, economic and social role, as summarised in table 1.

Integrated natural resource planning also means incorporating ecological or green building principles into the design of sites or individual buildings.

Table 1

Ecological, economic and social role of natural resources

	Ecological role					Economic role				Social role			
	Creating a favourable microclimate	Biodiversity resource	Ecological linkage / corridor	Climate change adaptation	Resource for eco-construction	Tourism development	Investor attraction	New jobs	Attraction of new residents	Public open space element – a place for socialising and communication	Environmental education resource	Local identity building element	Landscape diversity and human aesthetic perception / experience resource
Terrain	x				x	x				x	x	x	x
Soil		x		x			x	x	x			x	x
Water	x	x	x	x	x	x	x	x	x	x	x	x	x
Vegetation	x	x	x	x	x	x	x	x	x	x	x	x	x
Wind	x			x	x	x	x	x	x	x	x	x	x
Sun	x			x	x	x	x	x	x	x	x	x	x
Precipitation	x			x	x	x	x	x		x	x		x

As a natural resource and a landscape element, **terrain** can influence the microclimate of a place, as well as visually separate the open space. Naturally or artificially made terrain can reduce or, on the contrary, increase wind strength. Therefore, correct shaping of the terrain can redirect wind flows and create a pleasant microclimate in the area behind the terrain elevation. Raised terrains can be successfully used to create individual landscape spaces, separating a given area from areas of high traffic noise or other functions.

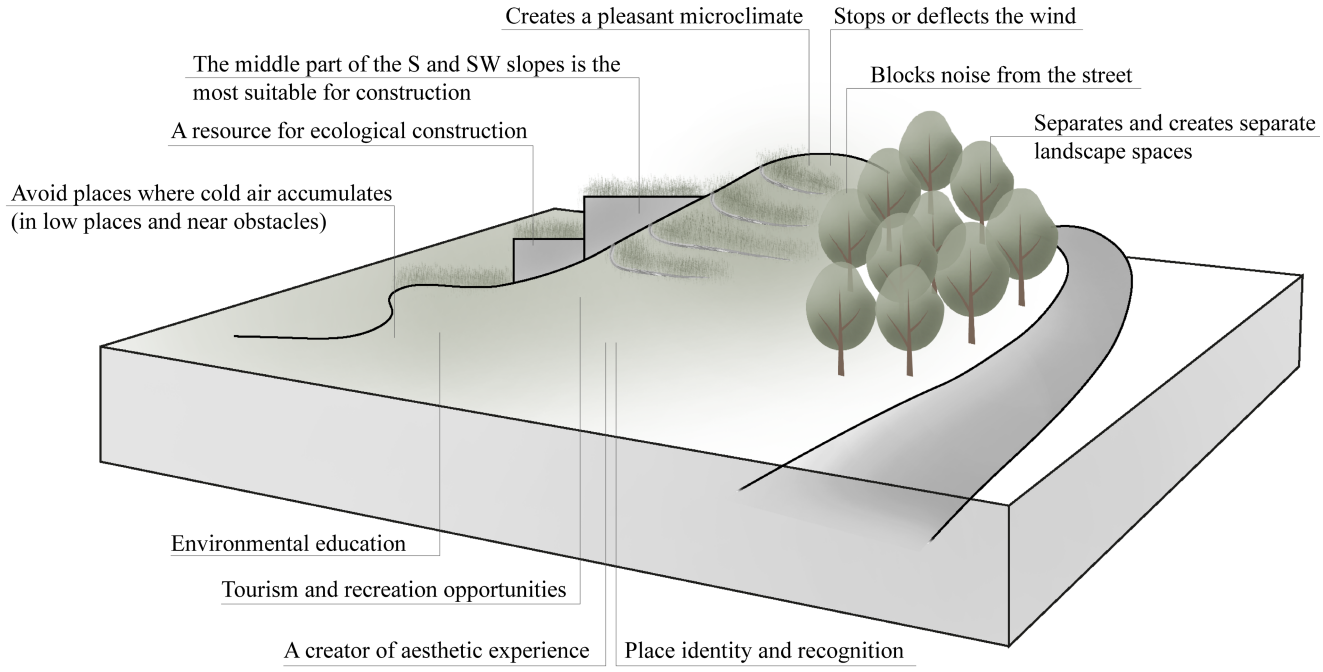

Figure 14. The potential of terrain as a natural resource in spatial planning and landscape architecture (created by authors)

TERRAIN AS A SEPARATING AND NOISE-DAMPENING ELEMENT, AN ECO-CONSTRUCTION TOOL

The Latvia's State Forests' Nature Park Glamping is located in the pine forest next to the Tērvete water reservoir and the Latvia's State Forests' nature park in Tērvete. The glamping consists of three types of houses. Some of them are designed as underground houses.

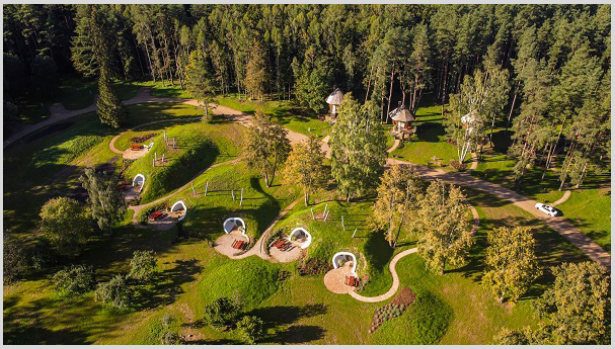

Figure 15, 16. Latvia's State Forests' Nature Park Glamping underground houses are designed using the terrain as both an element of eco-construction and as a separating and noise attenuating element of the individual landscape space (Latvian State Forest ...; Glemping of the Latvian ...)

The earth embankments that form the terrain elevations serve both as construction material and as separating elements for individual recreational spaces. Small hills with integrated houses also separate this glamping area from the road.

Terrain **or its imitation in the form of buildings** also serves as a material for eco-construction, ranging from the placement of objects with different functions (buildings, parks, etc.) in the terrain, where the middle of slope D is the most favourable for construction, to terrain elevations as part of construction, where buildings embedded into the terrain or the shape of the buildings resembles the terrain forms.

TERRAIN AS A TOOL FOR BUILDING AND OPEN SPACE DESIGN

The East-Latvian Centre for Creative Services "Zeimuļs" is an interest education centre for children and youth in Rēzekne. The architecture of the building – the façade and roof lines – creates a link with the adjacent hillfort and the Livonian ruins, taking advantage of the existing terrain and spatial character of the site.

Figure 17. The roof planes of Rēzekne Centre for Creative Services "Zeimuļs" continue the form of the adjacent hillfort, forming a unified ensemble (Eastern Latvia Creative ...)

The link with the hillfort is achieved by means of the roof of the building, which is formed by several planes of different inclinations, which seem to continue the character of the hillfort slopes. The roof planes are covered by a 3000 m2 green roof made up of turf and different varieties of goldmoss, creating accents of different colours. Built in 2012, the building houses a student interest education centre, a tourist information centre, a craft shop, a choreography hall, as well as creative industries and restoration workshops.


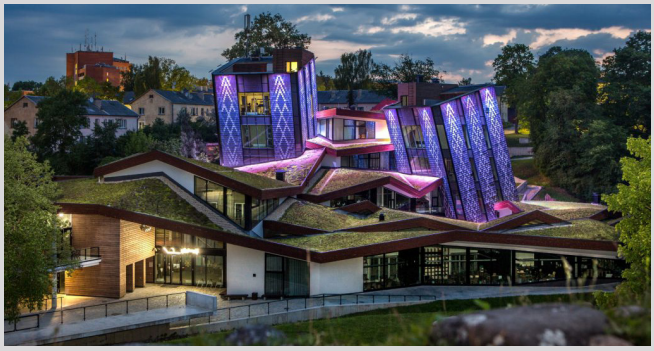

Figure 18, 19. The building of Rēzekne Centre for Creative Services "Zeimuļs" fits into the cultural and historical environment while maintaining a modern urban character (Eastern Latvia Creative...)

However, the placement of buildings and other open space elements in terrain should be carefully considered, taking advantage of the benefits provided by the terrain and mitigating the negative impacts. For example, cold air accumulates in terrain depressions, hollows and near obstacles, preventing it from flowing away. Therefore, cold air must be allowed to escape, not by dense barriers that encourage the formation of "lakes" of cold air, but by hedges, fences with openings, buildings of the right shape.

Vegetation and greenery play an important role in creating quality living spaces. Vegetation provides several functions.

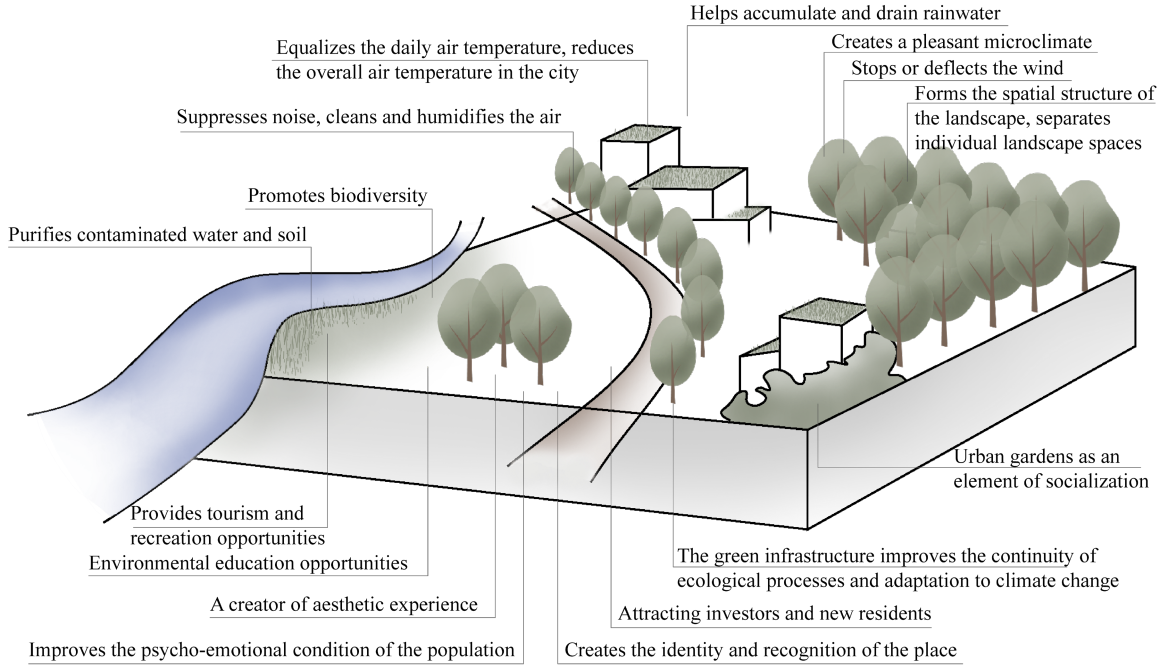

Figure 20. The potential of vegetation and greenery as a natural resource in spatial planning and landscape architecture (created by authors)

The main one is ecological. Vegetation and climate interact with each other. On the one hand, climate influences the choice of plants for planting – for example, in a coastal area, the climate will be more even, without sharp fluctuations in day and night temperatures. On the other hand, vegetation also influences the microclimate of a place, as it can protect the area from wind and snow, help clean the air of dust and pollution from fumes, and reduce overheating of buildings, hard surfaces and soil in hot weather, clean soil and water, absorb CO2, trap UV radiation and noise, accumulate and drain rainwater, reduce flood risks, act as key elements of green infrastructure, habitats for plant and animal species, and contribute to biodiversity. Urban forests, parks and larger green spaces also improve air exchange in cities in hot weather, when warm air from buildings and hard surfaces rises higher and is replaced by cooler air from green spaces. This results in natural ventilation of the area. In areas where draughts occur (e.g. courtyards of multi-storied residential buildings), greenery can help prevent or reduce them.

Urban green space can also have an economic role, as they can create an attractive environment for existing and new residents, investors and tourists by developing new tourism or recreational products. Choosing low-maintenance plants that are suitable for the site conditions can help reduce the costs.

URBAN MEADOWS FOR INCREASING BIODIVERSITY AND ENSURING LOW MAINTENANCE COSTS OF THE GREEN INFRASTRUCTURE

Urban Meadows Initiative. In 2021, the Latvian Fund for Nature established the project "Urban Meadows", in the framework of which it cooperated with Riga neighbourhood associations, Riga City Council, Salaspils Municipality Council, the association "FreeRiga", the Botanical Garden of the University of Latvia and the Riga National Zoological Garden. The campaign aims to reduce management costs, promote biodiversity in urban environments and familiarise people with the meadow as an ecosystem.


Figure 21, 22, 23. The Latvian Fund for Nature initiative in the "Urban Meadows" project. Meadow in Salaspils, invitation to sow 1 m2 of meadow and project logo (Magones un..., 2021; Latvijas Dabas..., 2021b)

20 grassland sites in Iļģuciems, Imanta, the centre district, Čiekurkalns, Teika and other Riga neighbourhoods with an existing diverse species composition and publicly visible location were selected where meadow creation campaigns were organised in autumn 2021. The first one took place at the Riga Zoo, where it stood out for its unique creation process using innovative methods. Riga City Council supported the implementation of the campaign on municipal lands and provides the necessary management by reducing mowing to twice a year, after the wild plants have ceased blooming, and mowing the nearest metre of footpaths and carriageways, guaranteeing the collection of the grass. In each meadow, perennial wildflower seed material, such as common daisy, yellow-rattle, bellflower, was obtained from the Botanical Garden of the University of Latvia and selected according to the site's moisture and light conditions. See the picture below for an example of Salaspils meadows. In the context of the "Urban Meadows" initiative, Riga City Council has developed special rules for meadow management in the city, as the previous rules did not include meadows as an element of urban greenery. As a continuation of the initiative, the Latvian Fund for Nature has nominated a 2022 habitat of the year – the city. The project also raised public awareness of the importance of meadows in the urban environment and encouraged citizens to sow their own square metre of meadow.

A well-designed greenery structure helps to organise movement and orientation in the urban environment, to separate and highlight certain functional areas, and to encourage people to be more active, improving their health. Plants have been shown to have a positive effect on people's psycho-emotional state, reducing stress levels, allowing people to take shelter from the shade provided by plants in hot and sunny weather, to absorb airborne phytoncides released by plants, and to breathe air that is cleaner of dust and richer in oxygen than in areas without greenery. Greenery thus also has a social role. It can also highlight the values of the site, strengthen the identity of the site, create a quality public open space and have a positive impact on people's physical and mental health. Like terrain, the forest clusters create spatiality in the landscape, successfully separating open and enclosed spaces, making the place visually attractive.

AGREENERY TO REINFORCE THE IDENTITY OF A PLACE

The small square between the office buildings in Munich (Oskar-Schlemmer-Straße) features large-scale, metal-framed open space elements, each integrating an activity (swings, recreational spaces, etc.) or greenery. Some of them use hops as a greenery element, reflecting the Bavarian countryside with hops and the brewing tradition.

Figure 24, 25, 26, 27. The greenery in the square uses hops, reflecting the Bavarian countryside and the tradition of hop-growing for brewing (*Square in Munich, 2019, photo by authors)*

Not only can **wind** be a negative element in spatial planning, for example in the case of draughts, where it contributes to unpleasant microclimates, soil erosion and loss of moisture, and where solutions are needed to mitigate the adverse effects of wind, but wind also has an important ecological, economic and social function. For example, it provides air exchange – moderate winds change air masses, leading to a more favourable, healthier microclimate, and it promotes pollination and seed transport. Wind can also be a source of energy. Wind can be used to develop specific tourism products such as theme parks, annual events, etc.

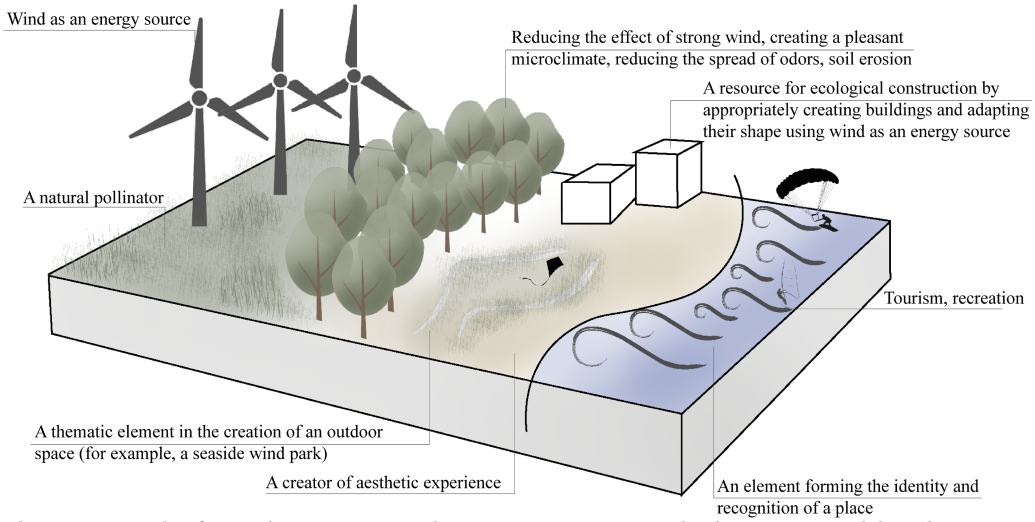

Figure 28. The potential of wind as a natural resource in spatial planning and landscape architecture (created by authors)

WIND AS AN ENERGY SOURCE INTEGRATED INTO ENVIRONMENTAL OBJECTS

Wind trees. New Wind's "Wind Trees" concept first appeared at the Le Bourget COP21 climate negotiations in 2015. Wind trees, which according to their manufacturers can generate 2,400 kWh from the wind each year, have now been installed in several European locations. The concept of the wind trees is designed to blend visually into the cityscape, while at the same time providing a variety of opportunities to use the generated reactive energy for the daily needs of city residents and visitors – charging devices, including electric cars, lighting.


Figure 29, 30. Wind trees with integrated mini wind turbines in France (Meet the wind..., 2016; The wind tree..., 2016)

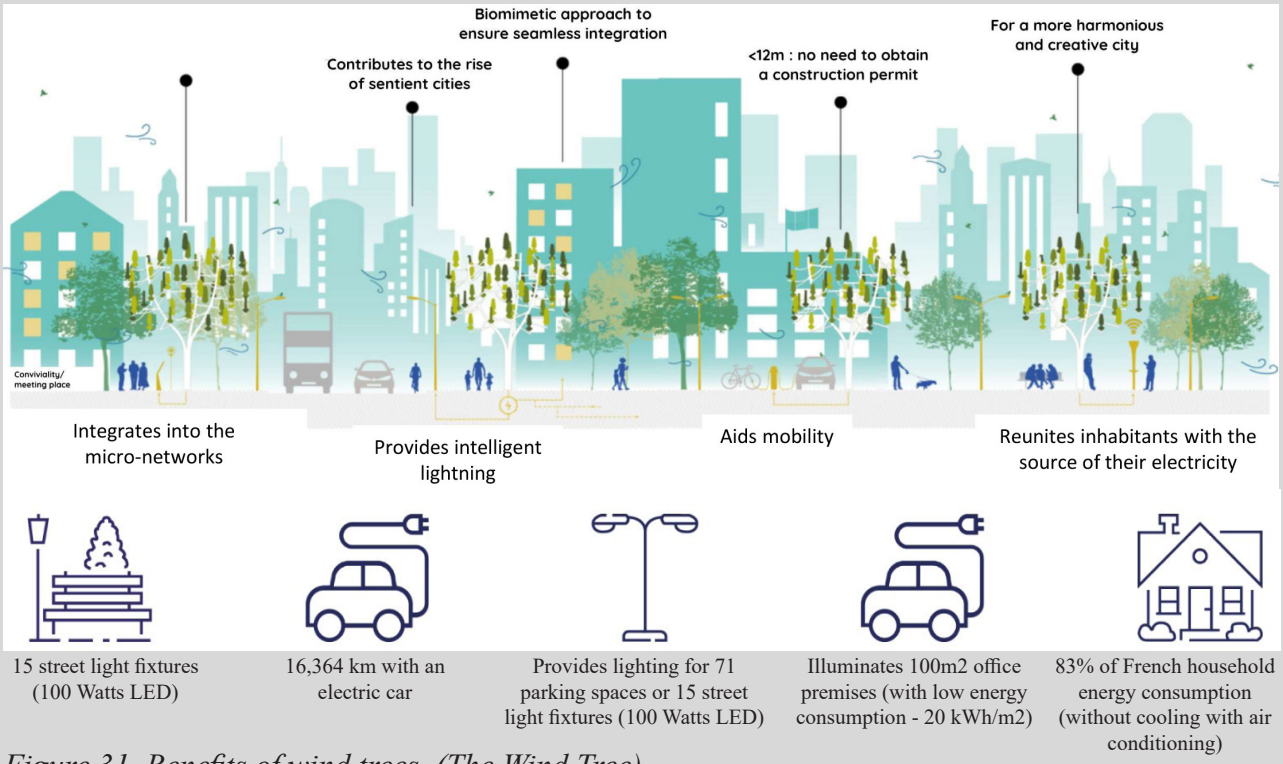

Figure 31. Benefits of wind trees (The Wind Tree)

The **solar** path is one of the most important factors in ecological building. Proper site planning can improve the quality of use of a site, e.g. planning sports fields according to the cardinal points of the sky by orientating them towards the east or the west. This helps ensure that sports matches are played under the same conditions for both teams, reducing the risk of glare. Similarly, the location of recreational facilities in the area should take into account the cardinal points.

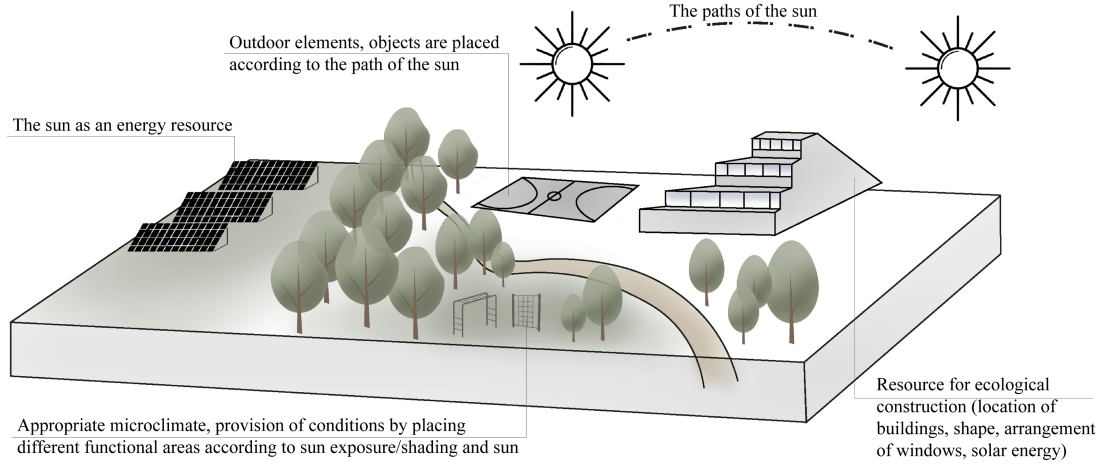

Figure 32. The potential of the sun as a natural resource in spatial planning and landscape architecture (created by authors)

For example, recreational areas are not usually placed on the north side, but on the west, or the evening sun side. Children's playgrounds, on the other hand, can be located on either the east, or morning sun side, the south or on the evening sun side, depending on usage patterns. Solar light and energy are also used in many ways in eco-construction, both in the architecture of buildings and in open space elements, such as benches combined with solar panels to generate electricity and for local use, such as charging small electrical appliances.

Figure 33. The shape of the building is designed to maximise the use of sunlight, make distant sight lines and create the surrounding landscape (Minner, 2010).

ECO-CONSTRUCTION USING SUNLIGHT AND SOLAR ENERGY

The architecture of the 8 House building in Ørestad, Denmark, uses a number of eco-construction approaches to make the building and its surroundings meet modern requirements and standards. One of the most important is shaping the building to the solar irradiance, harnessing both sunlight and solar energy and making the building energy efficient. The 8-shape line of the building, with its slopes and elevations, also helps create a greater connection with the surrounding landscape – the shape of the building allows distant sight lines from the living areas to the surrounding landscape.

The building and its open space are multifunctional. There are commercial buildings on the lower level, then residential buildings with outdoor gardens, apartments, luxury apartments with green roofs and terraces, and courtyards as an enclosed open space for the residents. The functionality of the building is ensured by combining the architecture of the building with its functions, as well as the possibility to use the facades and roofs of the building – both as a walking and panoramic path around the building, which extends up to the roof, and as space for roof gardens and separate smaller garden spaces at the entrances to the living areas. Small green spaces at entrances are typical of Denmark's rural settlements and small towns, so these solutions also add to the identity of the place.

Figure 34, 35. The facades of the building feature a walkway around the building up to the roof. The walkway adjoins small garden spaces with entrances to the residential part of the building (Minner, 2010)

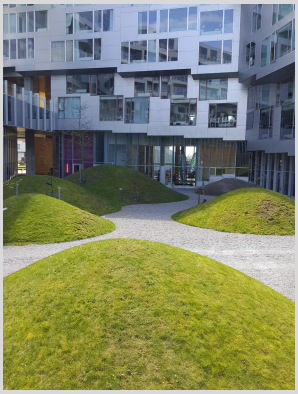

Figure 36, 37. The shape of the building, designed in the shape of an 8, allows the creation of enclosed public open spaces – recreational areas for the building's residents and employees (Minner, 2010)

Figure 36, 37. Sustainable rainwater management through green roofs and water accumulation and drainage channels provides a climate-smart approach (Minner, 2010)

The layout of the building ensures its integration into the overall infrastructure of the district, linking it to the main axes of movement and creating new public open spaces. Rainwater accumulation and drainage through green roofs and rainwater drainage channels contribute to the site's adaptation to climate change.

Water, including through **precipitation**, plays a very important climate-shaping role. Larger bodies of water and watercourses reduce the difference between night and day temperatures and the likelihood of frost, thanks to their high heat conduction and heat storage capacity. The high humidity caused by evaporation traps heat in the air and contributes to dew formation in windless conditions. Examples in agriculture and horticulture show that ditches or streams smooth out low night temperatures and protect adjacent areas from frost. Several small bodies of water are more effective in terms of climate than one large body of water because air exchange and temperature equalisation take place directly in the coastal zone.

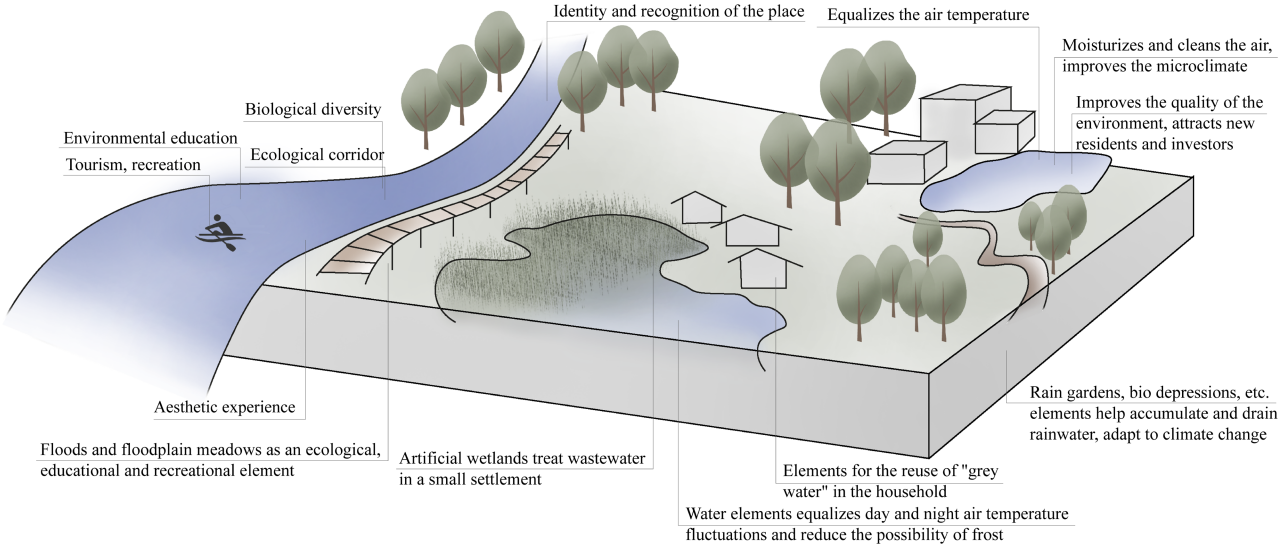

Figure 38. The potential of water as a natural resource in spatial planning and landscape architecture (created by authors)

In the urban environment, water not only serves an ecological function by humidifying and purifying the air, improving the microclimate, but is also an important resource for tourism, recreation and aesthetic experience. It is no coincidence that in several major European cities, former port industrial areas are being transformed into residential, office and recreational areas. A good example is the Western Harbour area in Malmö, Sweden, where not only the waterfront has been given over to recreation, daily and working life, but also a number of other sustainable solutions have been introduced, such as rainwater accumulation in surface water features, establishment of green corridors, linking the major green areas of the site, green roofs and facades, etc.

WATER RESOURCE FOR IMPROVING THE QUALITY OF LIFE AND DEVELOPING TOURISM

The Western Harbour is an area in Malmö, Sweden, which first made Malmö known as a sustainable city. The history of the Western Harbour began in the 1770s and ended in the late 1980s. It was home to one of the largest shipyards in the world. The area has undergone significant changes over the last decades, moving from an industrial to a mixed-use urban area, providing residents and visitors with access to an important water area and the opportunity to enjoy the proximity of water. The first part of the transformation of the Western Harbour was the Bo01 exhibition area, dedicated to the theme of sustainable urbanism, which was completed in 2001. The final projects in the Western Harbour are scheduled for completion around 2035. The aim is now to develop the Western Harbour area as an example of a sustainable urban environment with a high standard of living of national importance. Western Harbour area has a well-designed and built environment and green infrastructure subordinated to the activity zones and the links – movement paths between them. The building complex is compact, leaving larger areas for greenery. The area has zones for different interest groups – zones for local borough residents, zones for recreation for all residents of the city, and zones for large-scale events or tourist attractions.

Figure 39, 40. Transforming a former industrial site into a mixed-use area, making it accessible to people and incorporating sustainable environmental solutions. Green infrastructure and networking of the area (Summary of VÄSTRA..., 2008)

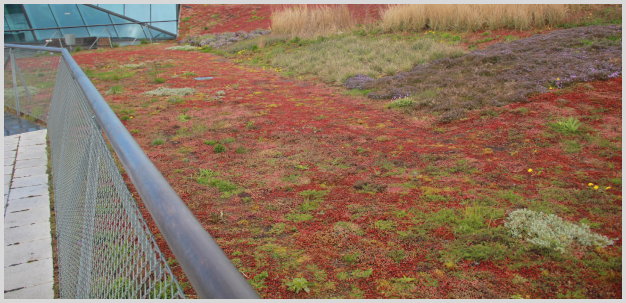

Figure 41, 42. A once inaccessible industrial area has been transformed into a sustainable and modern residential, leisure and office district with access to water (photo by authors)

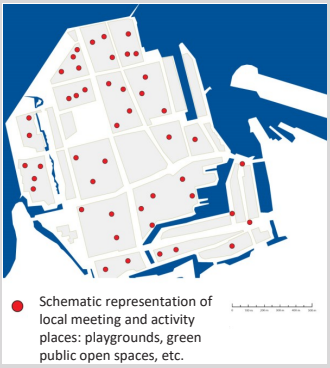

Figure 43, 44, 45. The Western Harbour area has been thoughtfully designed with activity spaces for different interest groups, which allows for a more efficient use of the area and separates the daily needs of the local borough residents from the interests of visitors or tourists (Summary of VÄSTRA..., 2008)

The development of the Western Harbour area includes a number of sustainable solutions – an underground waste collection and sorting system, sustainable rainwater collection and drainage, green roofs and facades that improve the microclimate and help absorb rainfall, accessibility to various services and interests (proximity to the city centre, well-considered layout of various activity areas), revitalisation of degraded areas and integration into the infrastructure of the neighbourhood, etc.



Figure 46, 47, 48, 49. Rainwater is managed in a sustainable way, accumulated and stored in ornamental water features, then purified by aquatic plants and discharged into natural water bodies and watercourses. (photo by authors)


Figure 50, 51. The building complex makes extensive use of green facades (pictured here: a multi-storey car park) and green, extensive roofs with goldmoss coverings, which help collect rainwater and reduce roof overheating, improving the microclimate of the site (photo by authors)


Figure 52, 53. The creation of separate areas for gardening provides people with the opportunity to socialise through urban agriculture. And degraded, post-industrial areas are being revitalised with soil-clearing green spaces and new functions, mainly recreation and sport. (photo by authors)

Precipitation, or rainwater, can also be managed sustainably, using the accumulated water resource as ornamental water features in the urban environment, while reducing flood risks and improving the urban microclimate. Solutions such as rain gardens, bio-depressions, accumulation basins, etc. are increasingly being used.

SUSTAINABLE RAINWATER MANAGEMENT THROUGH RAIN GARDENS AND THE INTEGRATION OF ORNAMENTAL ENVIRONMENTAL FEATURES

Sustainable rainwater management solutions can also be used in the central parts of large cities to reduce flood risks that can result from heavy rainfall when underground utilities are unable to capture the full volume of rainfall. In addition, green areas specifically designed to accumulate rainwater, such as rain gardens and bioswales, accumulate rainwater and allow it to gradually infiltrate into the soil or be discharged into natural watercourses or reservoirs. Examples include Deichmans Gate and Wilses Gate in Oslo.

Figure 54, 55. Deichmans Gate and Wilses Gate, Oslo. Accumulation of rainwater in rain gardens and creating attractive features (water sculptures) at roof rainwater catchments. ***(photo by authors)***

Several interconnected rain gardens that collect rainwater and gradually drain excess water, eliminating the need for an underground pipe system in this section of the street. Rain gardens have an accumulation capacity of around 60 cubic metres of rainwater. The water accumulation system integrates granite elements that reduce the intensity of the flow by storing it in recesses in the granite, thus visualising the amount of water stored. The water features also serve as a play area for children from the neighbouring primary school, while the rain gardens serve as an exploratory and environmental education element. The rain gardens feature perennial plants that are visually attractive in different seasons, and the plants chosen are able to thrive in both wet and dry conditions. Additional capturing of rainwater is also provided by permeable road paving materials, such as gravel cover and reinforced grass, which are placed in small recreational areas.

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INTERACTION BETWEEN LANDSCAPE AND SOCIETY – SOCIAL GROUPS, IDENTITY AND SENSE OF BELONGING TO A PLACE

Madara Markova

In the context of integrated natural resource planning, people themselves and their participation in shaping their living space, based on their knowledge, experience, social group membership and needs, also play an important role. In the 21st century, landscape has become an important factor influencing social processes. Place and space in sociology and human behavioural sciences are not just a background of activity or a socially descriptive element in a person's social or demographic profile, but a diverse resource for everyday life and future planning, but people have different capacities to use these resources and different strategies to achieve their quality of life and their preferred lifestyle.

Political and economic processes at different levels (local, national, global) are important in shaping the landscape. In this respect, it is important that people are not only present in the landscape, but actively influence it (through participation).

Figure 56. Landscape and its constituent (Swanwick, 2002)

SOCIAL GROUPS

It is important to be aware of social groups to ensure their inclusion in the various landscape planning activities. Groups are, by definition, a numerically limited collection of people who share certain common characteristics. It is essential that the members of the group meet certain social characteristics that distinguish them from another group. The members of a group are not identical, but they share a common general characteristic. And, importantly, a person can belong to several groups and therefore be more or less interested in the development of a project. Social groups and their interests have not always been a priority for planning. The inclusion of human interests in planning has been a topical issue since 2000.

Social psychologist Muzafer Sherif has formulated a definition of a social group: it is a social unit consisting of a number of individuals interacting with each other with respect to common motives and goals; an accepted division of labour, i.e. roles, established status (social rank, dominance) relationships; accepted norms and values with reference to matters relevant to the group; development of accepted sanctions (praise and punishment) if and when norms were respected or violated.

A common distinction is made between primary groups and secondary groups. The primary group is usually small, characterised by extensive interaction and strong emotional ties, and is more time-resilient. This means that even if the group members do not meet for a long time, the ties remain strong. Members of such groups care deeply for each other and identify closely with the group. Their membership of the primary group forms a large part of their social identity. Primary groups are, for example, family, small friendship groups at school, groups of peers in a city neighbourhood that meet regularly. Our actions and decisions are very directly influenced by the primary social group. Secondary groups are characterised by being larger, more impersonal, and we are often in the group for a relatively short time. Secondary group members feel less emotionally attached to each other than primary group members and do not identify as strongly with their group. Secondary groups are members of different organisations. Primary and secondary groups can act both as our reference groups and as groups that set

the standard for our own behaviour and attitudes.

Sociology in general focuses on large-scale studies, but there is also a second strand – micro-sociology. Micro-sociology is much more focused on the study of concrete actions and processes that are also linked to a specific place. When it comes to processes and place, two elements are essential in defining place: the centre (the place itself), and the periphery (the dominant background). The social aspects of landscape are as important as the natural, aesthetic and perceptual aspects. The landscape is multifaceted and is also shaped by the social processes that take place within it.

IDENTITY

In recent decades, several studies have been carried out on landscape identity. It should be recognised that this concept is not strictly definable, as it encompasses two broad and changing concepts – landscape and human perception. Landscape identity is a social as well as a personal pattern. Scale (place, region, country) is essential for defining and studying landscape identity. Landscape identity is changing, influenced by changing stakeholders, changing goals, new stakeholders, new functions that become important. The identity that an individual attaches to a landscape is linked to the person's social/cultural environment. Landscape identity unites residents among themselves or in a neighbourhood and distinguishes them from residents of another area. The issue of landscape identity is therefore a holistic one, and working in the landscape requires not only valuing the landscape itself and highlighting its values, but doing so in direct connection with society, including research into public perception.

Landscape identity is defined as the perceived uniqueness of a place. Perception is influenced by personal and social aspects, while uniqueness is based on the interaction of spatial and social factors.

Figure 57. Example of a mental map of the Rēzekne River (created by aythors)

It is believed that when people try to represent a place, they imagine it through several specific groups of landscape elements – roads, hubs, boundaries, districts, and landmarks. Roads also include streets, walkways, trails and other features that people use to get around, which may often be features only known to local people. Hubs, or more precisely nodal points, are objects that are clearly defined, identifiable and can be used as reference points. Boundaries are the edges that can be read in the landscape, which can be perceived as walls, buildings, water edges, the slope of the terrain if it is pronounced. Neighbourhoods, or districts, can be relatively large parts of a city, distinct in identity and/or character. Dominants are reference elements in the landscape, usually those that can be seen from a distance and are also unique in some way. In general, this makes it possible to represent it in mental maps.

SENSE OF PLACE

In recent decades, several studies have been carried out on landscape identity. If we can look at identity on different scales, the scale of place offers a more precise and deeper possibility of exploration, as well as a link to another concept, which is the sense of place. Sense of place is linked to place-making. Places/landscapes are continuously being created. Place-making involves not only the deliberate construction of a place using building materials, but also when people identify a place in their consciousness and give it mental meaning. The sense of place, or imageability, is confirmed by the contrast between the object to be defined and the background, or frame. Life can be very different for people living in a city with different resources and opportunities. It depends on social and economic status, employment status, income, values and perceptions of what a good life is. Sense of place is closely linked to attractiveness of the place and is directly influenced by the people who live there. In addition, both long-term and short-term residents (students, temporary contract workers, etc.) are relevant. There are groups of people who "build" places with practices and activities.

A sense of place is also essential in defining the character of a place. Interestingly, a given place may be used by different groups in society, at different times of the day, and so the sense of place – its meaning – may also change over time and within the context of a given social group. Sense of place is not a stationary quantity. Two variables contribute to the consolidation of a place's significance: the different uses of the place (different groups of people use the place and the place is used at different times of the day) and the regular, repeated uses of the place (the place is used repeatedly over a week, a month or other period of time).

SOCIALLY INCLUSIVE LANDSCAPE PLANNING

Universal design is a new way of thinking, based on the idea that people are the core value of society. Universal design does not impose specific requirements on a particular group, but makes every service (including education), infrastructure and environment accessible to everyone in society.

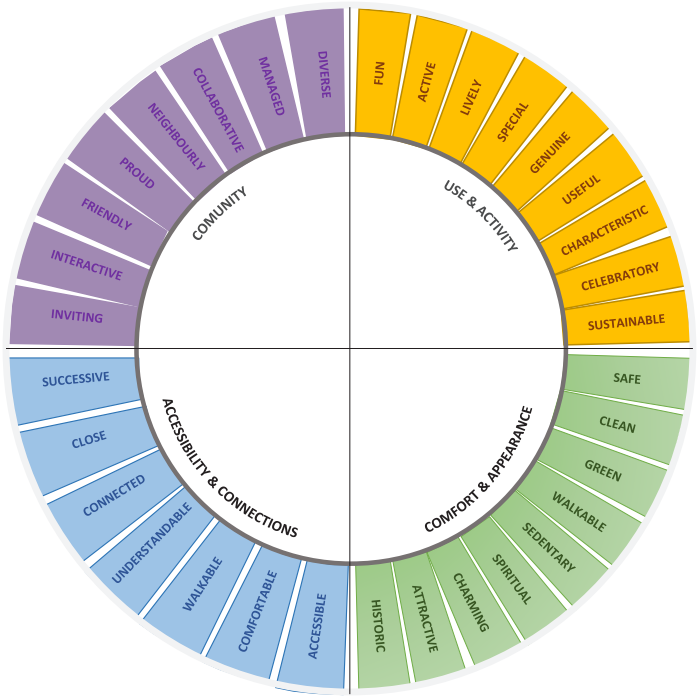

Figure 58. What makes a good environment?

1. Accessible: all public places should be physically accessible to all, regardless of their physical, cognitive or mental ability.

2. Comfortable: A sense of security is essential for a feeling of comfort, but an overarching sense of belonging helps everyone to feel comfortable in the space. The versatile design offers opportunities for people with different abilities and disabilities to promote a sense of belonging.

3. Participation: cooperation is needed because professionals are not aware of all the difficulties faced by people with disabilities, young mothers, seniors, young people – in an environment created without their participation.

4. Environmental protection: Nature and green spaces have been shown to have a positive impact on mental, cognitive and physical health for people of all ages and abilities. Universal design should deliver these benefits throughout the built environment, creating spaces that people want to visit and spend time in, while improving environmental sustainability and supporting biodiversity.

5. Legible: Clear and comprehensible designs with easy-to-read markings and signs help people of all ages and abilities understand how to navigate their way around. The distinction between places of movement and places of rest can help people understand how spaces are supposed to work.

6. Walkable: the environment should be walkable as it increases the possibility of using different services.

If we want everyone to participate in public life, we need to design and build a public open space that is accessible to all. Social life cannot be only for the able, the young or the healthy. A good tool for planning, designing and discussing socially inclusive environments is a thorough assessment, taking into account all the different aspects of an open space. Basically, it is necessary to assess existing and desired activities, use, level of public attraction, accessibility, connectivity, comfort and appearance.

PARTICIPATION

In a democracy, the public has the right to participate in the development of the country and in the formulation and management of local development policy. Public participation is the right of both individuals and groups to participate in the various stages of planning and to express their views in decision-making processes. Well-organised and inclusive public participation ensures that the solution/decision or planning approach is favourable to all. Public participation gives all stakeholders the opportunity to have their say.

- Public participation must go beyond the statutory norms and be tailored to each planning level and project.

- There is a need for a mediator in the planning process, as the dialogue between local authorities and the public is often counterproductive.
- Good communication with different groups in society can be achieved through a communication plan that ensures strategic and targeted communication between the municipality and the public.
- Public involvement and the collection of public opinion must be carried out in a professional manner and under the guidance of competent experts to ensure a high quality and useful collection of views.
- Projects need to allocate additional time and expertise to communication and opinion-gathering activities, thus ensuring a much higher project quality.
- Communication between the municipality and the public is a two-way process; on one hand, knowledge is gained from local communities, and, on the other hand, information is provided to the public about the intentions and vision of the municipality, as well as those of developers.

The knowledge that is available to the public, but not to the municipality or the planners, is the sum of the diversity of values, customs and opinions of the community.

Four levels of involvement are basically defined, which can be measured in two ways: how much the local authority invests in public involvement, and how much the community as a whole and its individual representatives need to be actively involved.

- **Informing:** announcements or notices, publications in the media (press, internet, TV, radio) direct mail, surveys (advertisements);
- **Involvement: gr**oup work, public meetings (seminars);
- **Participation (passive):** advisory councils, focus groups, forums, pop-ups, other methods;
- **Participation (active):** negotiations, systematic action, agenda setting (neighbourhood project).

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Assessing and exploiting the potential of natural resources

IMPLEMENTATION

ECOSYSTEM SERVICES

Natalija Ņitavska and Aiga Spāģe

UNDERSTANDING

How important is one or another natural resource, or a combination of them? Natural resources can be valued as part of an ecosystem and the services or benefits it provides. Before understanding how ecosystem services work, it is worth returning to the question of what ecosystems are. An ecosystem is made up of a collection of living organisms (a biocenosis or biome) and an environment (a biotope) that interact to gradually transform it. A biocenosis includes microbiocenosis (micro-organisms), mycobiocenosis (fungi), phytocenosis (plants) and zoocenosis (animals). The notion of a biotope is interpreted in Latvia in two ways – as the non-living (abiotic) component of an ecosystem, or including also the living (biotic) elements of the environment. In the latter case, the term "habitat" is often used. The concept of an ecosystem covers ecosystems at different scales, from microscopic to macroscopic. Ecosystems are most often considered at a medium scale, referring to fairly large areas with relatively homogeneous environments, such as certain types of forests, grasslands and water bodies. Ecosystem boundaries can be distinct, but most often they form a border zone or ecotone where species from both ecosystems can be found, such as grassland and forests.

Only when organic matter is produced, transformed and decomposed in an ecosystem at the same time is the functioning of the ecosystem normal. The main function of an ecosystem is to ensure the flow of energy between living things and the circulation of substances between living and non-living things.

The ecosystem services approach has been widely studied and used to assess different features of natural, landscape and urban environments, to generate reliable evidence on ecosystem functioning and public goods, and to support decision-making. Ecosystem services are described differently in different sources, but one of the first definitions in the Millennium Ecosystem Assessment was that **ecosystem services are the benefits that people derive from ecosystems**. The definition of ecosystem services has had a snowball effect, with a large number of studies focusing on ecosystem services and their valuation.

ECOSYSTEM SERVICES APPROACH AND GROUPS

The relevance of the ecosystem services approach is that it can change people's attitudes to the whole system of nature conservation. The ecosystem services approach allows a different perspective on nature conservation as an area that is important for everyone in society, as it ensures that local ecosystems are conserved so that they can provide quality ecosystem services to people and thus provide them with a quality and fulfilling living environment. The ecosystem services approach is based on a **desire to balance nature conservation and economic interests** so that they are balanced and developed in a forward-looking way that does not adversely affect each other.

Ecosystems provide a wide range of services to people, which can be divided into 3 broad groups (Ecosystem services):

Supply or back-up services

Food	Ecosystems provide the conditions for people to grow food
Raw materials	Ecosystems provide a variety of building materials and fuels, including wood, biofuels, etc.
Freshwater	Ecosystems play a key role in the global hydrological cycle by regulating the flow and purification of water
Treatment resources	Ecosystems and biodiversity provide many of the plants used in the pharmaceutical industry to make medicines

Regulatory and support services

Climate and air quality	Trees and other plants play an important role in regulating air quality by counteracting human pollution in the atmosphere
Disaster prevention	Ecosystems and living organisms protect from hazards of floods, storms, landslides, etc. For example, wetlands can absorb water from rainfall, trees can stabilise slopes
Preventing erosion and maintaining soil fertility	Soil cover significantly prevents potential soil erosion. Soil fertility is important for plant growth, so that they can be supplied with the nutrients they need
Habitats for species	Habitats or biotopes provide everything a plant or animal needs to survive – food, water, etc.
Maintaining genetic diversity	Genetic diversity is the diversity of populations of genes and species. It distinguishes different species and varieties from each other, thus providing a basis for native species

Cultural or intangible services

Recreation, mental and physical health promotion	Green spaces play an important role in maintaining people's mental and physical health
Tourism	Ecosystems and biodiversity play an important role in tourism. Cultural and ecotourism can also educate people about the importance of biodiversity
Aesthetic inspiration	Biodiversity, ecosystems and landscapes inspire art, culture and science

METHODS FOR VALUATION OF ECOSYSTEM SERVICES

Ecosystem services are valued using biophysical, social and economic assessment methods. Economic and social valuation methods can be an important support for decision-making on land-use change or on activities that affect the status of ecosystems and the services they provide. Economic valuation puts a monetary value on ecosystem services and helps inform discussions about the role of ecosystems in society's well-being. However, not all the benefits of ecosystems can be quantified in monetary terms. Biophysical valuation, on the other hand, serves as key information for nature conservation or spatial planning.

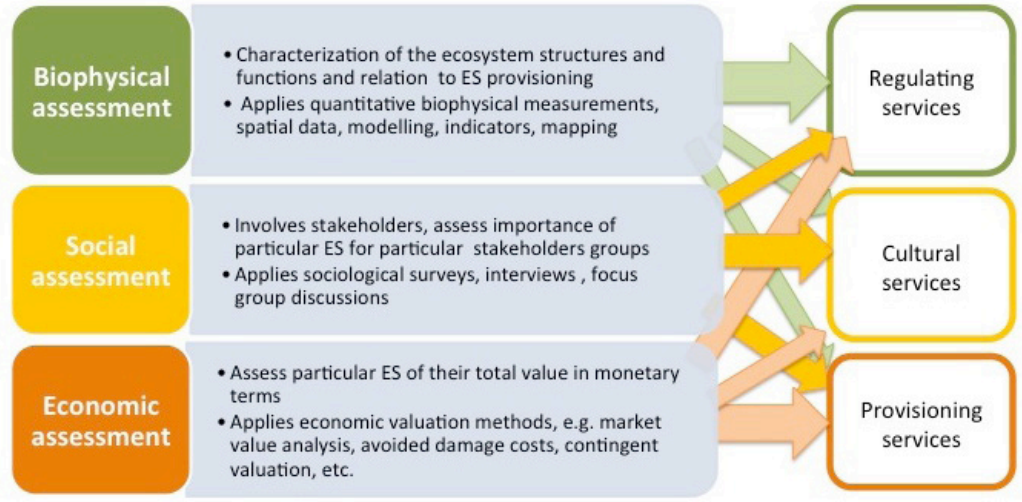


Figure 59. Methods for valuation of ecosystem services (Assessment of ecosystem...)

MOTS POPULAR TOOLS TO VALUE ECOSYSTEM SERVICES

Descriptive ecosystem service valuation tools (descriptive ecosystem service valuation tools provide guidance and a framework for carrying out assessments of different ecosystem services): EST (The Ecosystem Services Toolkit); ARIES (ARtificial Intelligence for Ecosystem Services; Co$ting Nature; NEAT Tree (National Ecosystem Approac Toolkit); PA-BAT (Protected Area Benefits Assessment Tool); TESSA (Toolkit for Ecosystem Services Site-based Assessment).

Computer-based modelling tools for valuation of ecosystem services (Computer-based tools for valuation of ecosystem services include both downloadable software and online tools. Modelling tools are often developed with the support of various financial instruments and can be used free of charge by contacting the developer and by logging in): ARIES (Artificial Intelligence for Ecosystem Services); BalticClimate; C$N (Co$ting Nature); EcoServ-GIS; InVEST (Integrated Valuation of Ecosystem Services and Trade-offs); LUCI; MIMES (Multiscale Integrated Model of Ecosystem Services); SolVES (Social Values for Ecosystem Services); VivaGrass tool – Integrated Planning for LIFE VivaGrass project; WW (Water World).

Hot-spot analytical methods for valuation of ecosystem services. For large-scale landscapes, more high-quality data are needed to value ecosystem services, and the choice of method may therefore vary. The use of spatial data for valuation of ecosystem services shows that large amounts of data can provide an overview of potentially high quality areas providing a range of ecosystem services. One of the most widely used methods to assess such high-quality areas is hot-spot analysis. By analytically assessing a specific area and dividing it into pre-defined quadrants, it is possible to determine the quality and potential of the area using the hot-spot method. The hot-spot method is used in many scientific fields, not least in the determination of ecosystem service provision. The details of the use of the method may vary slightly depending on the specific field of study, but the main steps of the method remain the same:

1. Step 1 – explore the area and mark the objects to be analysed, sometimes grouping them in order of importance. For example, by analysing and marking all cultural and historical objects, as in the example from Olaf Bastian et al., 2013.

Agriculture
- open farmland
- agricultural land in the forest
- extensive farmland
- meadow with some fruit trees
- meadow
- wet meadow
- heather
- a hedge

Forestry
- old wood stand / forest
- medium old wood stand / forest
- forest with open fields / meadow
- breeding forest
- a separate clump of forest

Hunting
- areas with hunting infrastructure

Fishing
- fish pond

Quarries
- ancient mineral mining sites
- old peat mining sites

Ancient equipment for processing food and other materials
- windmills
- water mill
- other mills

Types of settlements
- a small village
- village
- individual homesteads

Construction types
- local traditional architectural style
- cottage

Traffic infrastructure
- alley
- old roads before 1900
- railroad before 1900
- narrow gauge railroad
- an old dam

Historical heritage areas / objects
- battlefield / trenches
- fortress, castle
- the manor
- park

Religion
- monastery

Cultural landscape elements: categories and types (Walz et. al., 2010)

2. Step 2 – divide the study area into quadrants. Quadrants, realms or any other form of division depends on the approach taken by the author and the scale of the area in question – the larger the scale of the area, the larger the quadrants.
3. Step 3 involves analytical work, analysing how many marked objects fall within a given quadrant – the more objects in a quadrant, the greater the area's potential. Most of the analytical work is carried out using GIS software, where additional tools are available separately for this particular method.
4. Step 4 – quadrants are graded according to importance by assessing the presence of specific objects in each quadrant; if objects have been assigned different levels of importance, mathematical statistical software is usually also used to calculate the quadrant importance.

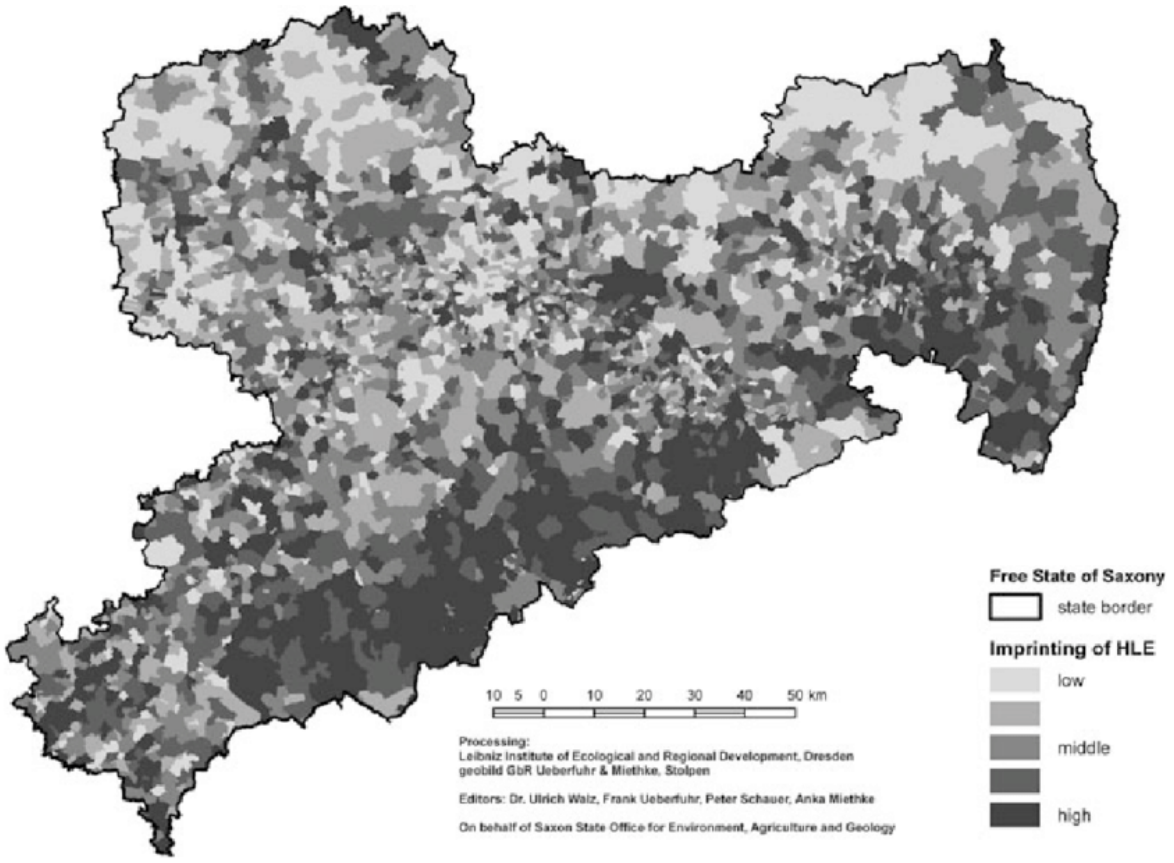


Figure 60. Identification of potential of cultural landscapes in Saxony (Germany) (Walz et.al., 2012)

Using hot-spot analysis is a way of understanding the potential of a particular area in a specific field, a method that helps to identify the opportunities and possibly also the weaknesses of an area. On the basis of the research obtained, it is possible to prepare detailed action projects, or, alternatively, to focus more on protecting high-potential areas, or, conversely, on using them for a specific purpose. In the example above, the cultural and historical sites analysed generally supply social ecosystem services, but the hot-spot analytical method can be used to analyse a wide variety of other functions.

APPLICATIONS OF ECOSYSTEM SERVICES IN LATVIA

In Latvia in 2014, the **LIFE Ecosystem Services** project was launched, covering the areas of Ķemeri National Park, Saulkrasti, territories around Riga, and Vidzeme. The project is co-financed by the European Union (EU) LIFE+ programme and the Administration of Latvian Environmental Protection Fund of State Regional Development Agency (VRAA LVAFA). The project will introduce an innovative approach to the protection of natural assets, balancing nature conservation with social and economic aspects. The project will also provide knowledge that can be used to develop development scenarios for different coastal regions and territories in Latvia. The project has started with the preparation of a theoretical base on ecosystem service methods and their use; several areas have been mapped, economic valuation has been carried out, and environmental objects in the Saulkrasti coastal area have been developed, and recommendations, information materials and publications have been prepared.

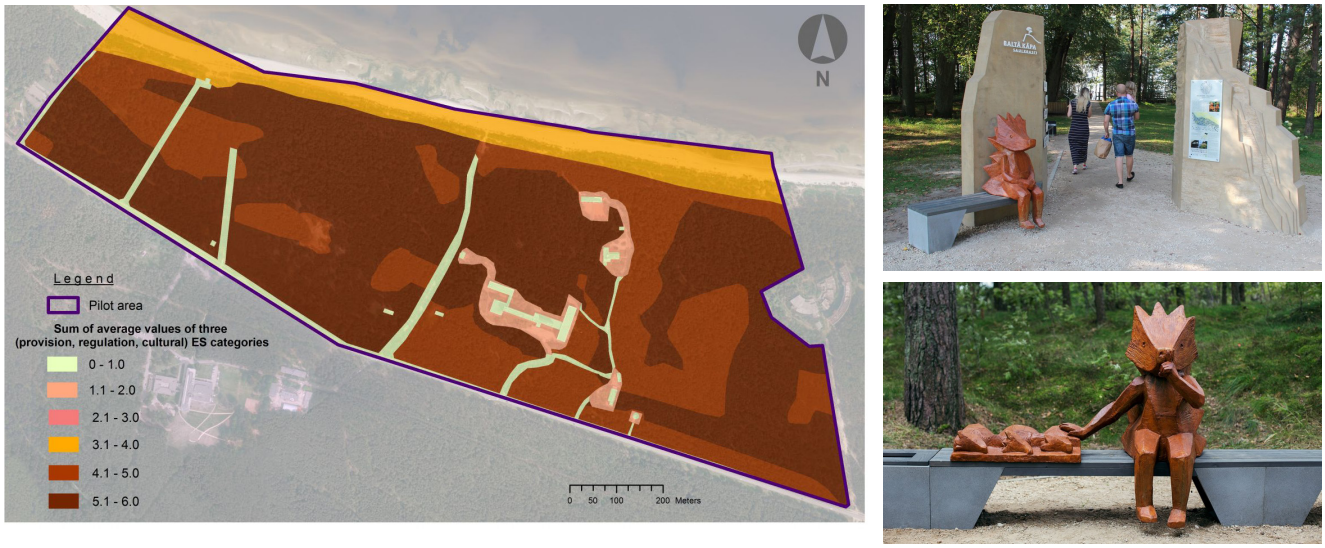


Figure 61, 62, 63. Example of ecosystem service mapping and environmental objects in Saulkrasti (Mapping of ecosystems...)

A toolkit for using the ecosystem services approach in planning provides recommendations for **integrating the ecosystem services approach into spatial planning**, which also enables practical assessment of ecosystem services – provision and economic valuation, assessment of changes in ecosystem service values for different spatial development scenarios.

Ecosystem service (ES) valuations can be an effective tool to support land-use planning decisions, as they can highlight the benefits and trade-offs between different land-use options, ideally integrating biophysical and socio-economic methods.

The project has developed a conceptual framework for integrating an ecosystem services approach into the planning process in eight steps.

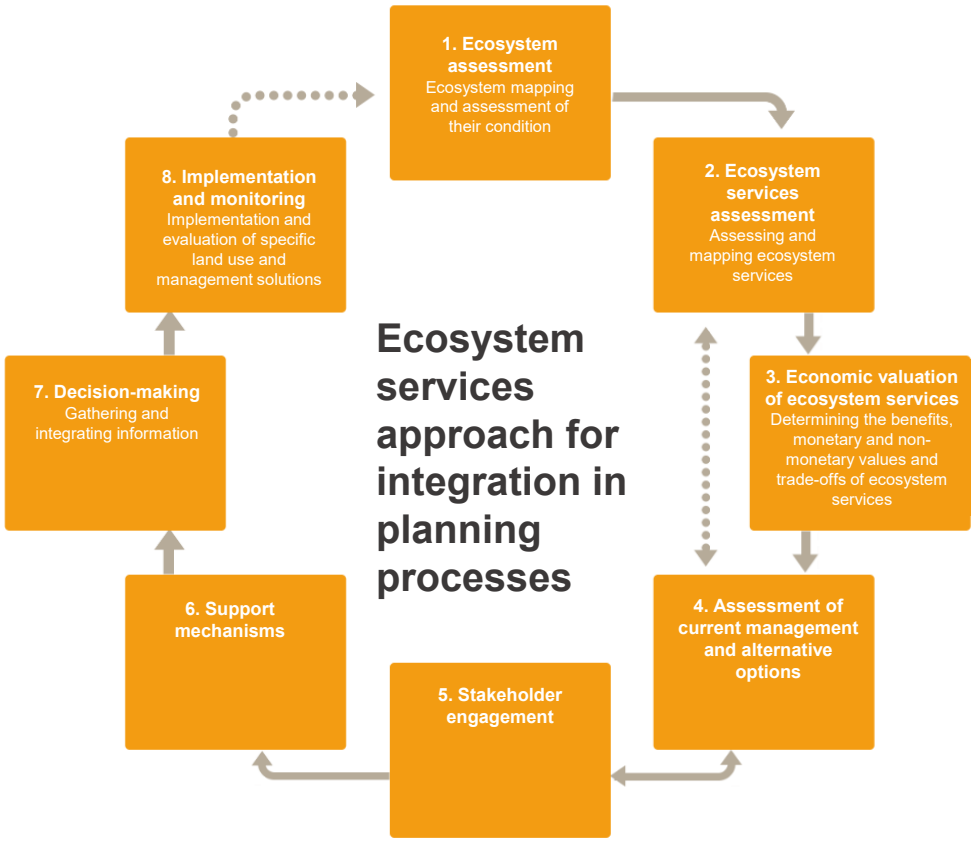
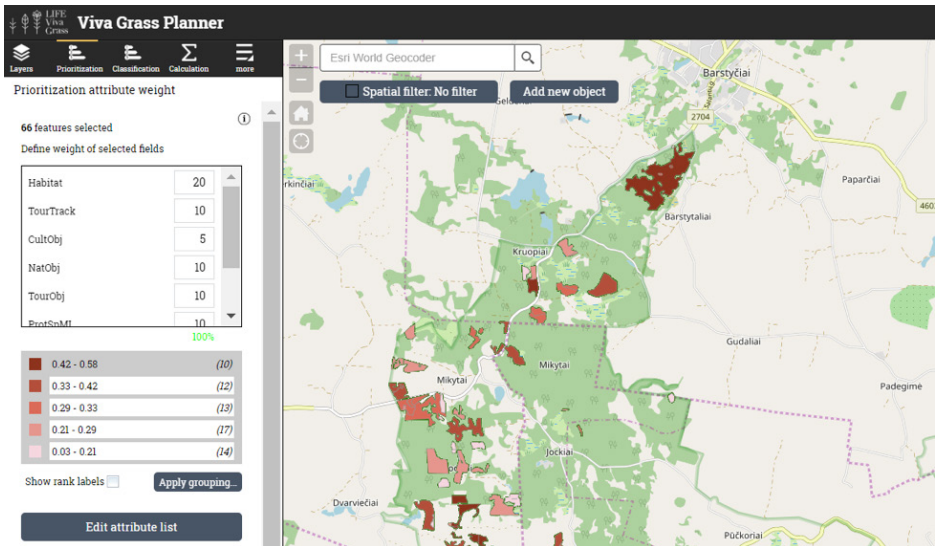
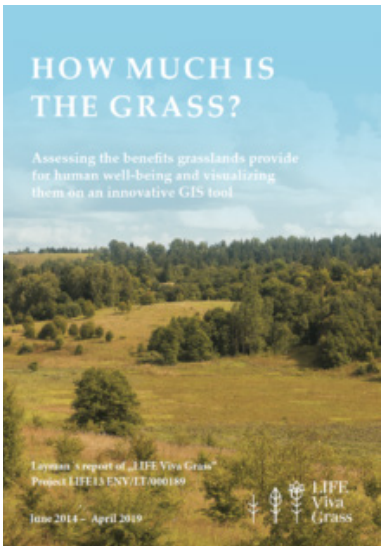


Figure 64. Framework for integrating an ecosystem services approach into the planning process in eight steps (A toolkit for using...)

The **LIFE Viva Grass** project, launched in 2014, aims to support grassland biodiversity and the ecosystem services it provides by promoting the use of the ecosystem approach in planning and by fostering economically sound grassland management. The integrated planning tool developed in the project demonstrates the potential of grassland ecosystem services, helps to understand the value of grasslands from both socio-economic and ecological perspectives, provides opportunities to compare different grassland types and assess their management options. The following activities have been carried out in the project: assessment of grassland ecosystem services in selected project areas at regional, municipal, protected area and farm scales; development of an integrated planning tool, including ecosystem-based planning and integration of socio-economic aspects into the nature protection policy; development of long-term scenarios for grassland management; training of different target groups on the application of the integrated planning tool at national, regional, protected area and farm scales.





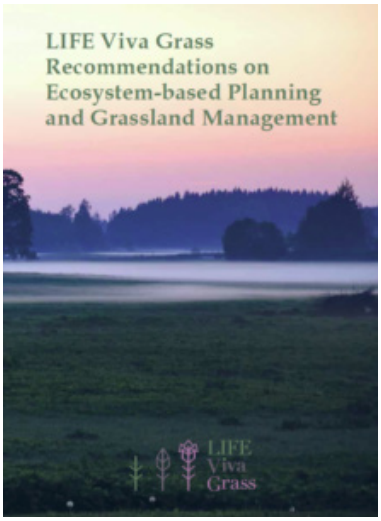


Figure 65, 66, 67. Integrated planning tool at municipal level and guidelines developed (About the Viva Grass project)

The Viva Grass **integrated planning tool** supports decision-making and sustainable grassland management. It promotes the integration of grassland ecosystem services into planning and decision-making by linking grassland biophysical indicators (e.g. land quality, terrain, land use) with expert assessment of ecosystem service provision, as well as the socio-economic context. The tool is based on an online GIS environment and offers users to assess the potential of ecosystem services provided by grasslands and the interactions within a user-defined area, and to develop ecosystem-based scenarios for grassland management and planning.

Figure 68. Integrated planning tool (Integrated planning tool)

The Viva Grass integrated planning tool has 3 modules: Viva Grass Browser, Viva Grass BioEnergy and Viva Grass Planner, each designed for a different target group and decision-making context.

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SUSTAINABILITY ASSESSMENT AND CERTIFICATION

Aiga Spāģe and Daiga Skujāne

Integrated natural resource planning is an important part of the sustainable development of any area. Assessing the sustainability of these objects is becoming increasingly important in designing territories and construction objects of various scales. Such project appraisal allows potential long-term environmental impacts to be identified from the outset.

Certification is a way to encourage projects to meet certain environmental targets. By obtaining a certificate, a company or municipality can also demonstrate its environmental objectives.

In general, there are a large number of certification schemes, some of which are only available in certain countries, while others are used worldwide. Certification systems can also vary depending on the type of object to be certified – whether it is a building or a territory, an element, or all of them. Peer-evaluation of systems is very complex, as each system uses different evaluation criteria, making them difficult to compare with each other, and depending on the need, it is possible to use a different system focusing on one or more specific categories.

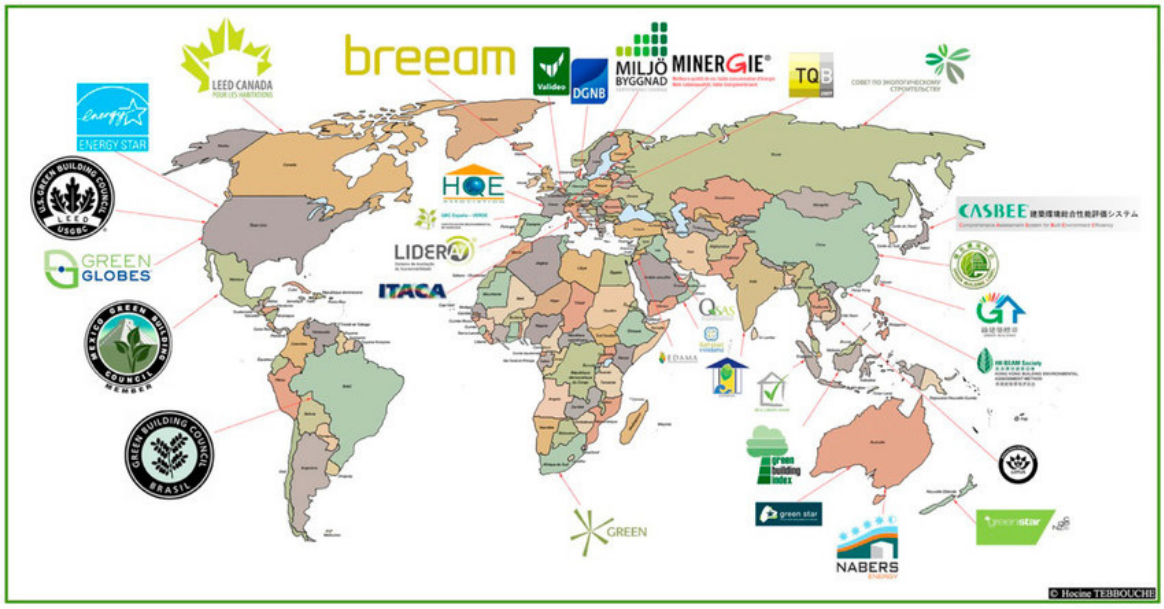

Figure 69. Sustainability assessment and certification systems and their use worldwide (Hocine et.al., 2017)

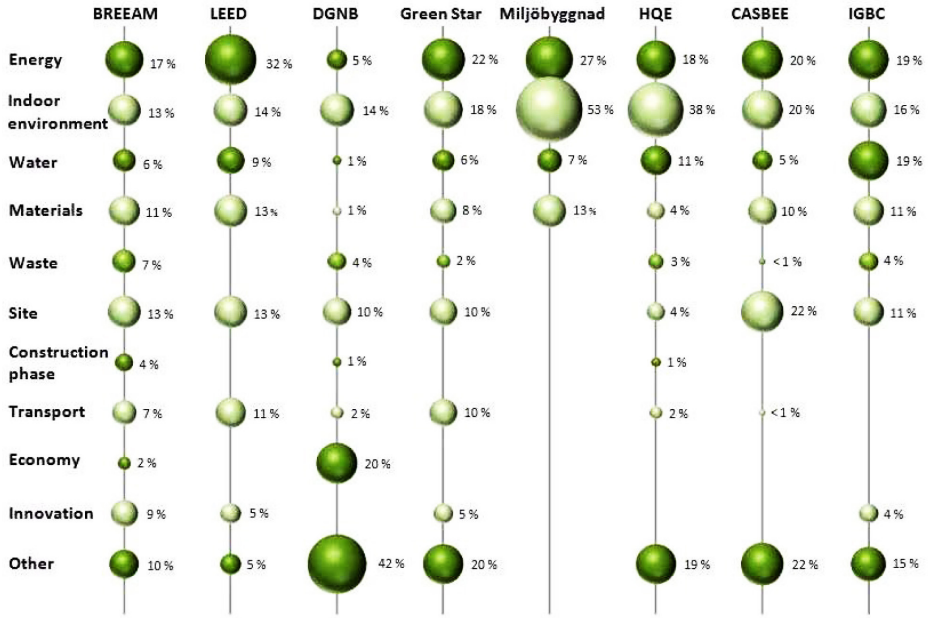

Figure 70. Percentage comparison of criteria for sustainability assessment and certification schemes (Heincke, Olsson, 2012)

While certification schemes are focused on buildings, sustainability assessment and certification is increasingly being applied to the open space. Examples of third-party verification systems for sustainable neighbourhoods and local open space development projects are BREEAM Communities, LEED and SITES. BREEAM and LEED certificates are already quite widely used systems, especially in the construction sector, while SITES is a newer certification system that focuses on site ecology and environmental aspects.

An assessment using the **BREEAM certification system** is based on 10 assessment sectors with a total of 57 criteria – (1) management; (2) health and comfort; (3) energy; (4) transport; (5) water; (6) materials; (7) waste; (8) land use; ecology (9); environmental impact and (10) innovation (additional sector). BREEAM standards vary from country to country (e.g. UK, USA, the Netherlands, Norway, Sweden, Germany, Austria). Certificates are awarded in 6 classes (with stars), depending on the eligibility criteria and the score.

The **LEED certification system** is based on 6 rating sectors, with a total of 47 criteria – (1) location and transport; (2) sustainable places; (3) water efficiency; (4) energy and atmosphere; (5) materials and resources; (6) indoor environmental quality, and a separate sector to add innovation, planning process and regional attributes to the rating. Certificates are awarded in four categories (standard, silver, gold and platinum).

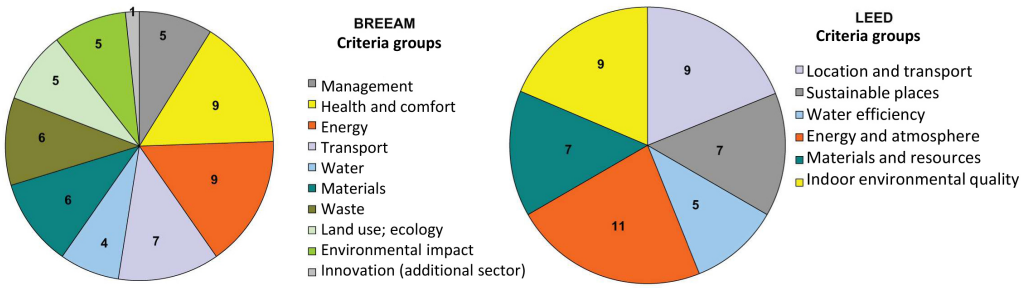

Figure 71. BREEAM and LEED certification criteria quantified by sector (Sustainable building certification..., 2018)

SITES offers a comprehensive assessment framework designed to distinguish sustainable landscapes, assess their performance and enhance their value. The SITES is used by a wide range of professionals to coordinate land development and management with innovative sustainable design. SITES certification is for development projects in places with or without buildings – from national parks to corporate campuses, streetscapes to homes and more. Certificates are awarded in four categories (standard, silver, gold and platinum). The SITES and LEED rating systems are complementary and can be used independently or together. The LEED rating system applies to the project building and the site in which it is located, while the SITES rating system applies to everything on the site except the building (with a few exceptions).

BREEAM COMMUNITIES CERTIFICATE OF EXCELLENCE – GARITAGE PARK IN BULGARIA.

Grade: BREEAM Excellent (71%)
Type of certificate: BREEAM Communities 2012
Project development: Stephen George International
Project supervision: Garitage Investment Management
Construction: GP Build

BREEAM®

Figure 72. Visualisation of Garitage Park (Garitage Park Residential...)

Garitage Park is located in Sofia, Bulgaria, a region with well-developed infrastructure and transport links, allowing quick and easy access to the city centre, the airport and all other parts of the capital. The Garitage Park project includes 95,000 m2 of office space, 60,000 m2 of residential space (terraced houses and apartments), 90,000 m2 of green space – a park with playgrounds and pedestrian zones, an international school for 500 children, a parking area, a sports centre of 3,000 m2 with a swimming pool, a gym for 1,700 people, a supermarket, restaurants, cafés, etc.

Key elements of sustainability in the project *(The first BREEAM Communities..., 2012)*

Implementation of energy-efficient solutions that promote sustainable use and management of building energy, such as heat recovery and recuperation systems.

Creating a more comfortable, healthier and safer environment for building users. One example is the significant increase in fresh air capacity in office buildings – more than 30% higher than in the highest A-class office buildings. Another example is the protection against noise and dust by creating a "green ring" around the complex.

Environmental sustainability by protecting and enhancing the biodiversity of existing plant and animal species. Improved ecology of the site, ecological links with the nearby Natura 2000 nature park "Vitosha".

Stakeholder participation and involvement (government organisations, local community, other stakeholders) in the design process, generating constructive ideas that are later implemented in the project.

Improving transport infrastructure by widening carriageways and adding new roundabouts. Incentivising solutions to use sustainable modes of transport such as bicycles or public transport, etc.

Controlling the impact of construction materials through waste management and recycling. 50% of construction waste is removed from the construction site.

24% of the total area of the complex accumulates rainwater. A 250 m3 water reservoir accumulates water and is used to irrigate green areas. Oil pollution abatement systems are set up.

More than 80% of the materials used are A+ or B rated as defined in the Green Guidelines (Green Guide)

Assessment systems are flexible, and it is not compulsory to meet all the requirements to obtain certification. The certificates are based on point systems: the number of points a project earns determines the level of certification it receives. Projects seeking certification score points in a number of areas that address sustainability issues. This process is carried out through online platforms (LEED or SITES) or requires a trained assessor to complete the assessment (BREEAM).

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POSSIBILITIES OF USING WATER RESOURCES IN THE URBAN ENVIRONMENT. SUSTAINABLE RAINWATER MANAGEMENT AND FLOOD-ADAPTIVE PLANNING

Daiga Skujāne and Inga Grīnfelde

Water is one of the most important natural resources, the basis of life, and thus its ecological and social role in the urban environment is of constant relevance. Over time, the concept of sustainability has evolved along with attitudes towards the protection and use of water resources, and there is increasing talk of sustainable stormwater management (hereafter "SSWM") through natural accumulation and infiltration rather than discharge to underground sewer systems. Similarly, as flooding situations increase due to climate change, new spatial planning principles need to be found that are adaptive and able to cope with both intense rainfall and river overflow.

Although there is no strict definition for SSWM practices and system solutions, in the wider professional community SSWM is understood as all those "green" design solutions that imitate the stormwater runoff and cycle of natural ecosystems in time and space. The practical application of sustainable stormwater management systems is gaining increasing and justified popularity, both because of climate change and the extreme rainfall it brings, and because of its various advantages and benefits.

SSWM systems control and prevent flood risks, improve and purify water, improve the quality of public open spaces and provide a biodiversity boosting function. SSWM includes solutions such as collectors, surface gutters, swales, rain gardens, filter strips, open drains and ponds, storage basins, green roofs, etc.

In urban environments, rainfall is accumulated from streets, pavements, roofs and other surfaces, which is why the SSWM practice integrates collaboration between landscape architecture, planning and environmental sciences to ensure the purity and quality of these waters, which is one of the basic objectives – to also provide a purification function. By implementing SSWM solutions, it is possible to effectively combine both public and private sector management to create a unified stormwater management system that harmoniously enhances the landscape, ecological, aesthetic and recreational values of the urban environment.

RAIN GARDENS

Rain gardens are areas with depressions designed to temporarily retain rainwater which slowly infiltrates into the ground. They also prevent erosion risks by reducing flow velocities and improve rainwater quality by removing polluted particles through biophysical and chemical treatment of soils and special plants. Rain gardens clean water of sediment, metals, bacteria, oil, organics, carbonates, phosphorus and oils.

Figure 73, 74. Rain gardens in Sheffield, United Kingdom (Innovation, flood prevention...)

Rain gardens have their advantages and disadvantages. When creating rain gardens, they can be easily integrated into the public open space, where recreational opportunities can also be developed. They can be created on a local scale, for example in a courtyard, or over larger areas. These wet areas are rich in biodiversity and increase groundwater supplies. However, rain gardens are not suitable for areas with a high water table or a pronounced terrain. They can be prone to insect infestations, and rain gardens often suffer from a lack of maintenance.

ARTIFICIAL WETLANDS

Artificial wetlands are bodies of water with extensive vegetation, aquatic plants to promote sedimentation, filtration and biological treatment processes, and they eliminate flooding from stormwater runoff. They are adapted to hold large volumes of water. An artificial wetland is a man-made wetland, swamp or pond created to treat polluted runoff, such as domestic sewage. Sand-gravel filters are used as the basis for the structure, supplemented with aquatic planting and a modified technology for wastewater supply and collection.

Artificial wetlands, created as part of the storm sewer system, have the function of smoothing and treating peak storm water flows. They act as a protective barrier and prevent pollutants from leaking into natural waters.

These structures are usually used before discharging wastewater into an open body of water. They can be used in residential areas in lower green areas where collected wastewater can be discharged to facilitate infiltration into the soil and treatment. They are easy to install in areas where moisture is already accumulating.

VUORES IN FINLAND

Vuores is a neighbourhood rich in natural resources in the southern part of Tampere, surrounded by natural forests and water bodies. The Vuores stormwater management system is one of the largest in the Nordic countries. Overall, the system integrates various elements (bioswales, ponds, wet meadows, etc.), including artificial wetlands that help not only store rainwater but also purify it. The main benefits of a stormwater management system are visually attractive and multifunctional green areas for people to enjoy, connected by green corridors, mainly consisting of stormwater channels and bioswales.

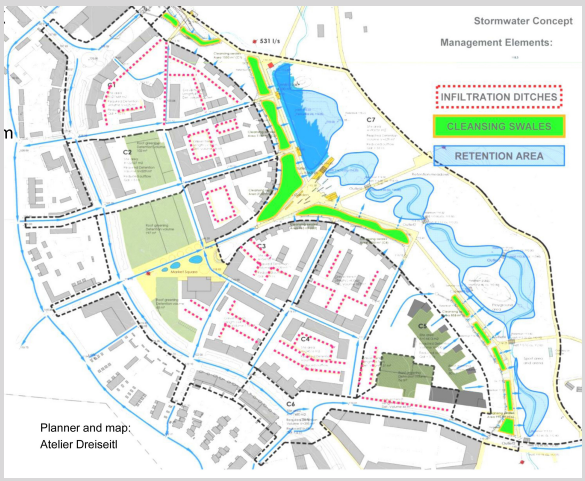


Figure74, 75, 76, 77. Vuores is planned with an integrated stormwater accumulation and drainage system for the whole city (Vuores Neihgborhood)

Figure 78, 79. Involvement of residents and local schools in various activities related to the environment and the development of Vuores (Vuores Neihgborhood)

Key approaches to site development:

- Vuores was developed on a natural site, so one of the objectives was to design it with environmentally friendly approaches
- The layout of construction allowed large areas to be used for the construction of a stormwater management system
- The process of co-creation with different stakeholders has provided an opportunity to gather new ideas for the future development of the site, based on integrated planning of natural resources
- The co-creation process also increased social cohesion

Wetlands have many advantages. They are very effective at removing soluble pollution, phosphorus, nitrogen and heavy metals. They also remove suspended solids from the water. Biodiversity is also a very important benefit, improving the microclimate of the area. However, as with any water collection and treatment structure, they have their drawbacks. The main ones are soil unsuitability, as wetlands can only function successfully in a certain soil composition, and wetlands require space that cannot be afforded in densely populated areas and can harbour too many insects.

PERMEABLE PAVEMENTS

Permeable pavements (sidewalks) are an opportunity to improve the functionality of driveways and parking areas by adding a runoff reduction function that does not require additional land area. This pays off mainly in densely populated urban areas, where space for other SSWM solutions is limited.

The main benefit of such pavements is the reduction of peak flows to water bodies, reducing the risk of flooding and erosion downstream. Pollution in runoff is also reduced by seepage through pavement and soil.

Pavements can be of two types: porous or permeable. Porous pavements allow water to infiltrate over the entire surface, while permeable pavements are made of a material that is impermeable to water, but because of the pores that permeate it, infiltration occurs through this pore structure. Permeable pavements provide a suitable surface for pedestrian and/or vehicular traffic, while allowing rainwater to infiltrate through their surface to the underlying layers. Water can be temporarily stored before infiltrating into the ground, reused or discharged into watercourses or other drainage systems. The sub-base layer of the pavement can ensure good water treatment.

Porous pavements have a lower load-bearing capacity than conventional pavements due to the absence of fine particles. This material is recommended for use in car parks, low-traffic roads (i.e. residential streets), cycle paths and pedestrian walkways. From time to time, sweeping or vacuuming of the debris will be necessary to ensure that the pavement does not become clogged.

GREEN ROOFS AND WALLS

Green roofs help accumulate rainwater in urban environments dominated by impermeable pavements. Green roofs are designed to intercept and store rainfall, reducing runoff volumes and peak

flows. Green roofs are divided into intensive and extensive ones. Intensive green roofs have a deeper, more organic substrate and can support a variety of plants, often including shrubs and small trees. These roofs are also often used for recreation. Extensive green roofs have a simpler, lighter and thinner profile. They are usually planted with succulents such as goldmoss or other drought-tolerant, low-growing plants.

Green roofs are very valuable for their ability to reduce urban air pollution and can and should be built in areas with a high density of construction. They improve microclimate and air quality without taking up extra space, and create specific biotopes for different plant and insect species. Buildings also benefit, as they are insulated from temperature fluctuations and energy costs are significantly lower. These green areas also act as a noise absorber.

However, they come at a relatively higher cost due to the specificities of installing and managing green roofs. Green roofs require additional loads from the green roof structure, substrate and other landscaping elements.

GREEN ROOF OVER THE EMPORIA SHOPPING CENTRE IN MALMÖ, SWEDEN

The striking architecture of the Emporia shopping centre, made up of 3D structures and curved, free-form glass facades, creates a futuristic impression. The building's architecture is complemented by a roof garden that alternates green roof planes with squares for seating. A wider public open space as a place to socialise is created in the centre of the roof.

Figure 80, 81, 82, 83. The architecture of the shopping centre building is complemented by a roof garden, alternating green roof planes with squares for recreation (Emporia shopping centre, 2012)

Living walls can also accumulate rainwater in a similar way to green roofs. Living walls can also act as good thermal insulation for a building. However, the limited range of plants used is a limiting factor, as not all plants are suitable for creating living walls in the conditions in Latvia, and their appearance may be of poor quality in cold seasons.

Figure 84. The Aeres University of Applied Sciences building as part of the international exhibition Floriade`22 in Almere, the Netherlands (Aeres Hogeschool, 2022)

DITCHES AND SWALES

Ditches, swales and gutters, depending on their physical extent, are intended for the collection and surface disposal of stormwater, for the filtration of water and for its storage. The physical design of ditches and swales is very similar, differing only in depth and cross-profile. A ditch is a trapezoidal trench excavated to a depth of at least 0.5 m. Shallower solutions with an oval shape and gentler slopes are called "swales".

Well-designed and constructed ditches and swales fit very harmoniously into any landscape, contribute to biodiversity and improve the microclimate (providing many ecosystem services or functions of the natural environment).

These solutions are mostly installed along streets and roadsides, but often are also integrated into elements of other green structures (parks, courtyards, etc.). Ditches and swales can be either planted or unplanted. If unplanted/unvegetated ditches and swales are chosen, from an aesthetic landscape point of view, they serve as gently sloping grassed channels where rainwater can both collect and flow to further solutions or simply infiltrate deeper into the ground. In an urban context, ditches mostly come with negative associations. They are characterised by odours, contaminated water, parasites and bloodsucking insect colonies, among other things. Of course, if ditches (including swales) are not properly maintained and cleaned, such prejudices may be true and in line with reality, but it should be noted that ditches and swales are important elements of the SSWM practice – and thus should be considered as serious stormwater management infrastructure with appropriate management. In this sense, swales are most suitable for complementing landscaping with a variety of landscaping elements – flowers, ornamental plants, mulch and other decorative-functional solutions. In the public open space, ditches and swales are mostly very gently sloping, typically supplemented by moulded stone banks and fortifications. Ditches, swales and gutters are usually formed in straight and geometrically correct lines, however, where space and resources permit, it is even advisable to create artificial meanders to imitate the natural flow. Greenery and various stone piles also add to the dimension of the public open space, reducing the water flow rate and encouraging infiltration. When selecting ditch or swale slope planting, it is very important to bear in mind the need to carry out local flora surveys to find out which plants and combinations of plants are best suited for the purpose – whether their moisture resistance is high enough and management is not onerous. The susceptibility of plants to pollution, or their ability to carry out phytoremediation – cleaning up lightly polluted waters and soils – must also be taken into account.

THE NANSEN PARK IN OSLO, NORWAY, is a unique area transformed from a degraded former airport site into a new, multifunctional and green public open space. The spatial plan gives special importance to sustainable stormwater management solutions, which are successfully integrated into the park landscape and serve not only for stormwater storage and drainage, but also as attractive and functional environmental objects.


Figure 85, 86. The park is designed as a dynamic dialogue between the strong linearity of the airport and the softer, more natural forms of the original landscape. The former terminal building and control tower are the starting point for the water object, which runs north-south through the park. The park has a system of water bodies. Water bodies are not only a great place to splash and play, but also an ecological infrastructure that accumulates rainwater from adjacent areas. A network of waterways stretches like 7 fingers into the fabric of the city (Nansenparken, 2008; Nansenparken, 2010)


Figure 87, 88. The park's rainwater accumulation engineering solutions are integrated into the landscape as interesting elements (photo by authors)

Figure 89. The linear structure of the former runway is used to create recreation areas (photo by authors)

FLOOD-ADAPTIVE DESIGN AND SPATIAL PLANNING

In Latvia, seasonal flooding is mainly associated with river overflows in spring and autumn, but flooding is also possible after heavy rainfall, when the large volume of rainwater cannot be absorbed by urban sewerage systems and the proportion of impermeable surfaces prevents the water from infiltrating naturally into the soil. With the impacts of climate change becoming more visible, we are increasingly talking about flooding and the risks associated with intense rainfall. This is why today's open spaces need to be designed and planned in an adaptive way that can adapt to change.

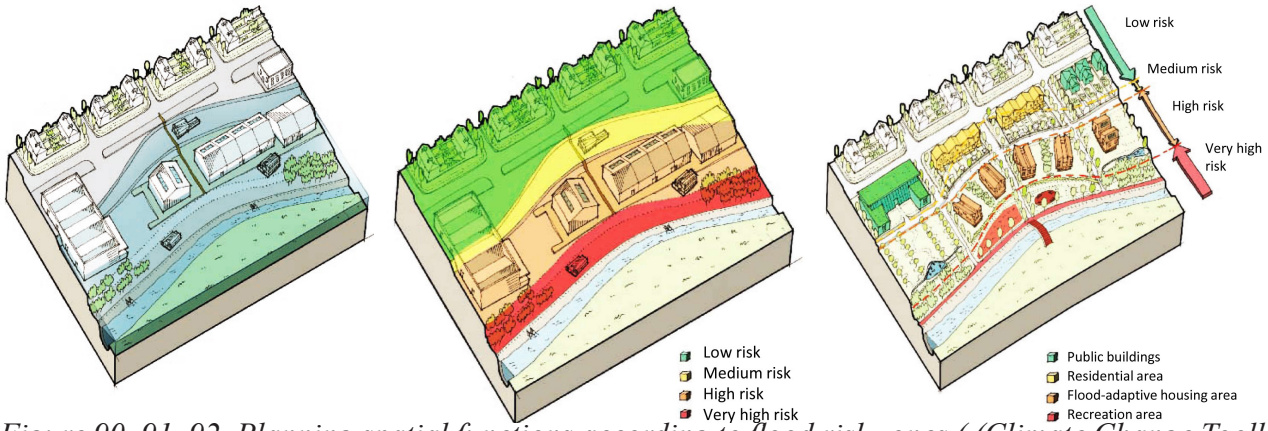


Figure 90, 91, 92. Planning spatial functions according to flood risk zones ((Climate Change Toolkit...)

Key principles for flood mitigation:

- **Preserving natural areas in river floodplains** by developing them as "untouched" areas, parks or other public open spaces. Leaving a sufficiently open and wide area for flood water accumulation. Spatial planning should take into account: high and low water levels, flood periods – frequency, duration, intensity, existing biodiversity, function and use of adjacent areas (industrial areas at risk of pollution, residential areas, etc.).
- **Flood-adaptive infrastructure** (replaceable elements adapted to water level fluctuations (pontoons, elevated elements, etc.)
- **Flood protection solutions** for areas, objects to be protected from flooding (terrain raising, dams, protective walls, etc.)
- **Solutions to reduce the impact of heavy rainfall on river overflows** – rain gardens and bioswales, etc.

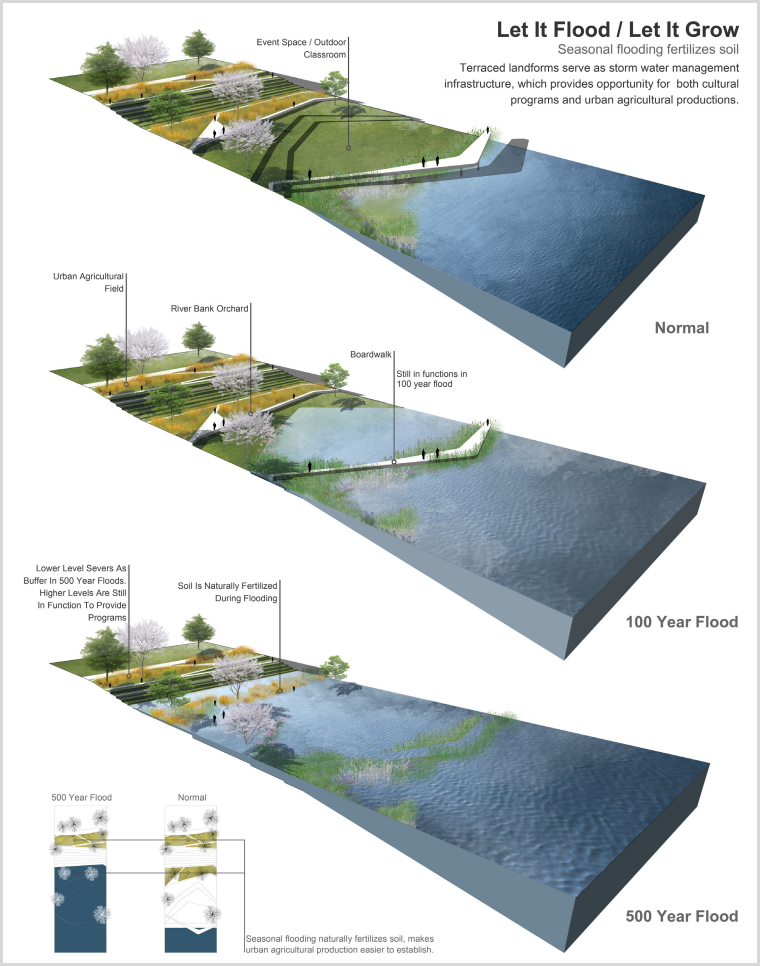


Figure 93. Competition work for the development of the Wabash riverbank (Natural Water as Cultural...)

Flooding as an opportunity for a diverse environment – the case of the Wabash River, USA.

The project aims to find a balance between human activities and needs and nature in the public open space on the banks of the Wabash River. At present, flood risk has prevented development of the site.

The project has developed the area on several levels, including activities for different interest and age groups, but also creating flood-adaptive landscaping. In the part of the site with the highest risk of flooding, footbridges have been created, which are also accessible in case of flooding. The flooded part of the site has been kept natural, while the non-flooded part has been used for more intensive landscaping. This includes the possibility of using the site for urban agriculture, given that flood waters enrich the site with nutrients.

Kirkkojärvi Flood Park in Finland is one example of good practice in spatial planning, adapting to floods while also using floods as a recreational and educational resource.

Figure 94. Kirkkojärvi Flood Park water dynamics and symbolic representation of the former lake during the floods (Kirkkojärvi Flood Park, 2020)

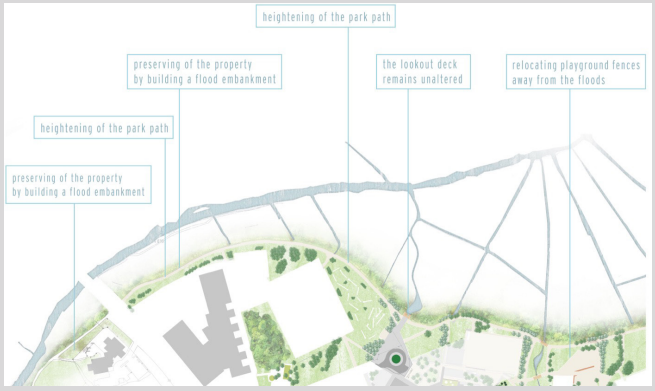
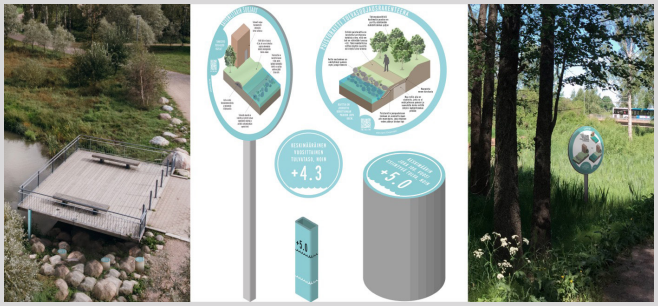


Figure 95, 96. Kirkkojärvi Flood Park zoning according to flood inundation (Kirkkojärvi Flood Park, 2020)



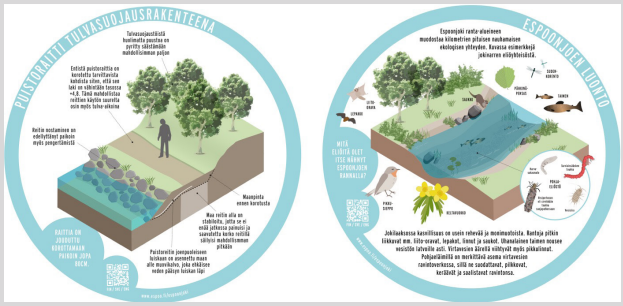


Figure 97, 98. Public education with information billboards and flood level (Kirkkojärvi Flood Park, 2020)

Kirkkojärvi Park is a green oasis in the Espoo River valley. The idea of the park is based on the use of water dynamics in interaction with the land form, which is shaped by the former lake shores and the bottom. Now the former lake that was located on the site is brought into the landscape as a symbolic element, represented by the flooded area. The lake returns to the landscape when the river floods.

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Implementation and management tools

EXAMPLES FROM PRACTICE

NATURAL RESOURCE MANAGEMENT TOOLS IN THE CONTEXT OF LANDSCAPE PLANNING

Natalija Ņitavska

Before defining the aspects of planning and governance, it should be noted that the two processes should be seen as closely linked and complementary, which should also be a key concept in planning practice: without governance there is no planning and, conversely, governance without planning is pointless. Together, these two processes form a continuous circular process with feedback to evaluate what has been planned and to adjust management and future planning. In addition, there is a temporal dimension, because the landscape is not static, but dynamic.

Following the European Landscape Convention, we need to quote the definition of landscape planning: "'landscape planning' means strong forward-looking action to enhance, restore or create landscapes". The European Landscape Convention explains the concept of landscape management as follows: "'landscape management' means action, from a perspective of sustainable development, to ensure the regular upkeep of a landscape, so as to guide and harmonise changes which are brought about by social, economic and environmental processes".

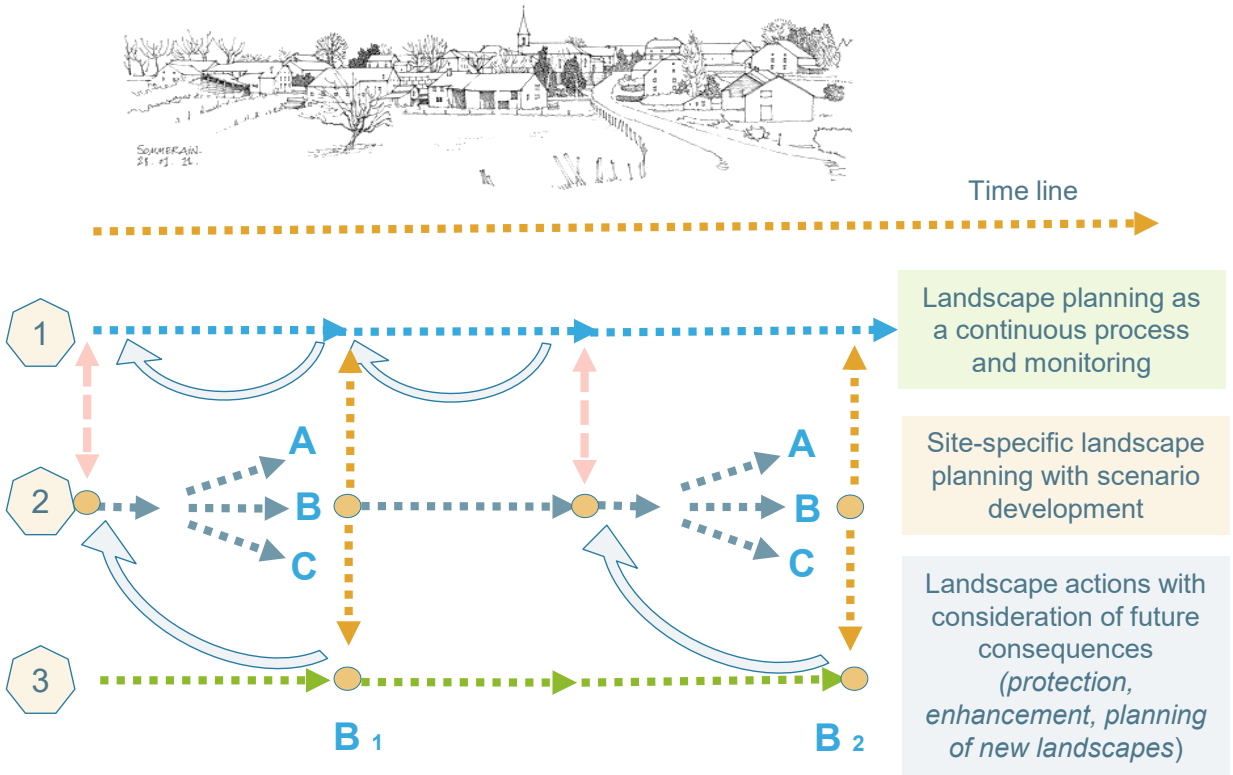

Figure 99. Landscape planning as a process (created by authors)

In general, several parts can be distinguished: the first part is regular action, not in the form of points or individual projects, but on an ongoing basis; the second part is looking to the future, thus being aware of the consequences that may change the landscape; and the third part is landscape planning, aimed at improving and restoring existing landscapes and creating new landscapes. One of the most important processes is the monitoring and analysis of each level, the feedback that allows for continuous adjustment of the landscape planning process, adapting to planning traditions, to adjustments and changes in the regulatory base, to the impact of climate change and to changes in public opinion.

LANDSCAPE PLANNING AND MANAGEMENT TOOLS IN FRANCE

In France, landscape planning has been tackled in several ways: landscape and regional nature park charters have been established; a charter is an overarching document of communication and agreement between the parties directly involved. A blue-green network has been developed at national, regional and local levels, as well as a tool for local authorities to work together on landscape planning.

Particular attention is paid to peri-urban farmland, where it is essential to preserve the traditional structure of the rural landscape and prevent intensification and marginalisation, as well as urban sprawl.

Landscape Charter (Charte Paysagère)/ France – Combines private and public interests. A voluntary planning and commitment tool between local authorities and the public, aimed at defining landscape conservation and management objectives and an action plan through public participation, which is one of the main objectives of the charter. Four main strategies are included: understanding and analysing the landscape in depth – working with stakeholders; defining landscape quality objectives and actions; developing a strategy and action plan; revitalisation and development.

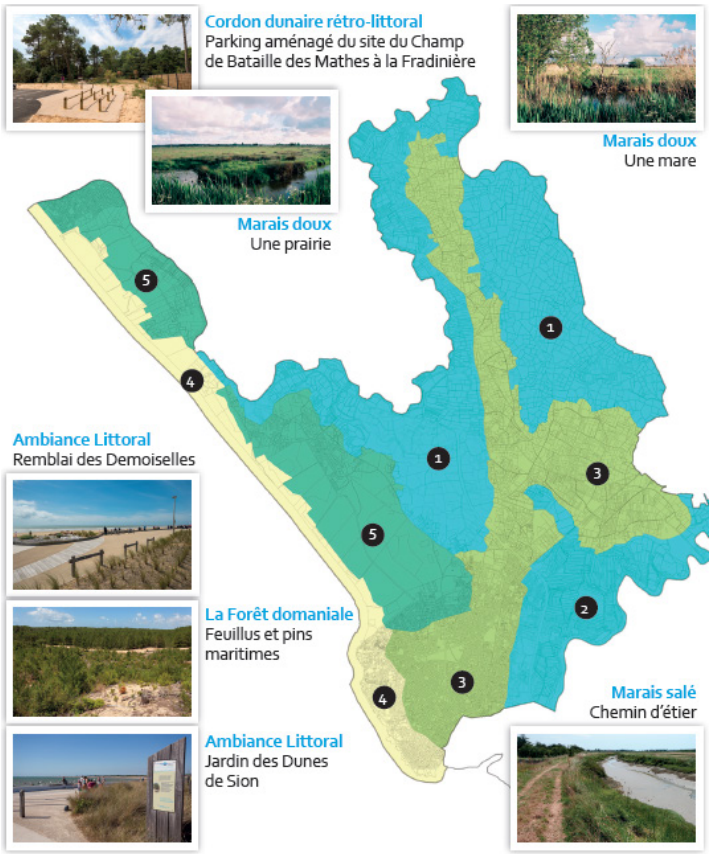

Figure 100. Spatial distribution of landscape units (Charte paysagère...)

Landscape plan (Plan de Paysage)/ France – Public involvement is one of the key objectives and includes a separate stakeholder involvement plan. Landscape plans aim to valorise landscape issues in sectoral policy planning documents. The plans act as guidelines for local authorities, with an emphasis on landscape quality objectives and how these can be incorporated into planning. The plans act as a blueprint for cooperation between local authorities to coordinate management in transboundary landscapes and align the interests of stakeholders. The plan includes – analysis of the landscape transformation processes, definition of the landscape values; drafting of the strategy and the necessary action plan; proposals and guidelines, depending on the objective set in the plan.

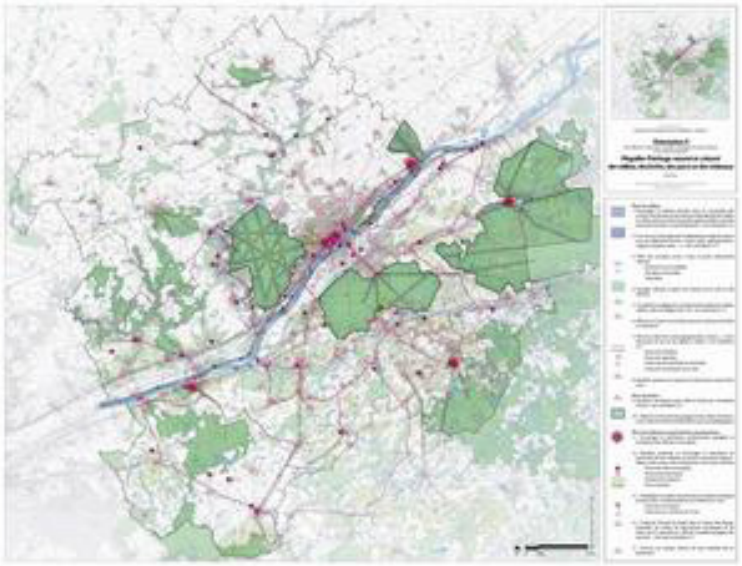

Figure 101. Example of a landscape plan (La plan de paysage...)

LANDSCAPE PLANNING AND MANAGEMENT TOOLS IN THE NETHERLANDS

The Dutch experience is based on landscape development plans at the regional and local planning level, which are binding for the development of spatial plans at the municipal level. Separately, there are public-initiative landscape quality plans, which are initiated by the public and are binding on the municipality or region. Detailed recommendations and concrete solutions for preserving landscape and build quality have already been developed in individual projects at site level.

Landscape development plan (Landschapsontwikkelings plan)/ the Netherlands – Public participation is mandatory and a condition for funding. Voluntary landscape management documents at the regional, inter-municipal and municipal level that serve as tools to support regional and local initiatives to conserve landscape diversity. Landscape development plans link with spatial planning at two levels – before zoning, or as part of zoning. According to the guidelines developed for the Landscape Development

Plan, the document should include – an analysis of relevant legislation and regulations; research and analysis of landscape development; definition of quality objectives; strategic goals and objectives; a landscape plan that includes the achievement of site-specific objectives; an assessment of the plan; tools and mechanisms for implementing the plan, an implementation schedule and a stakeholder engagement plan.

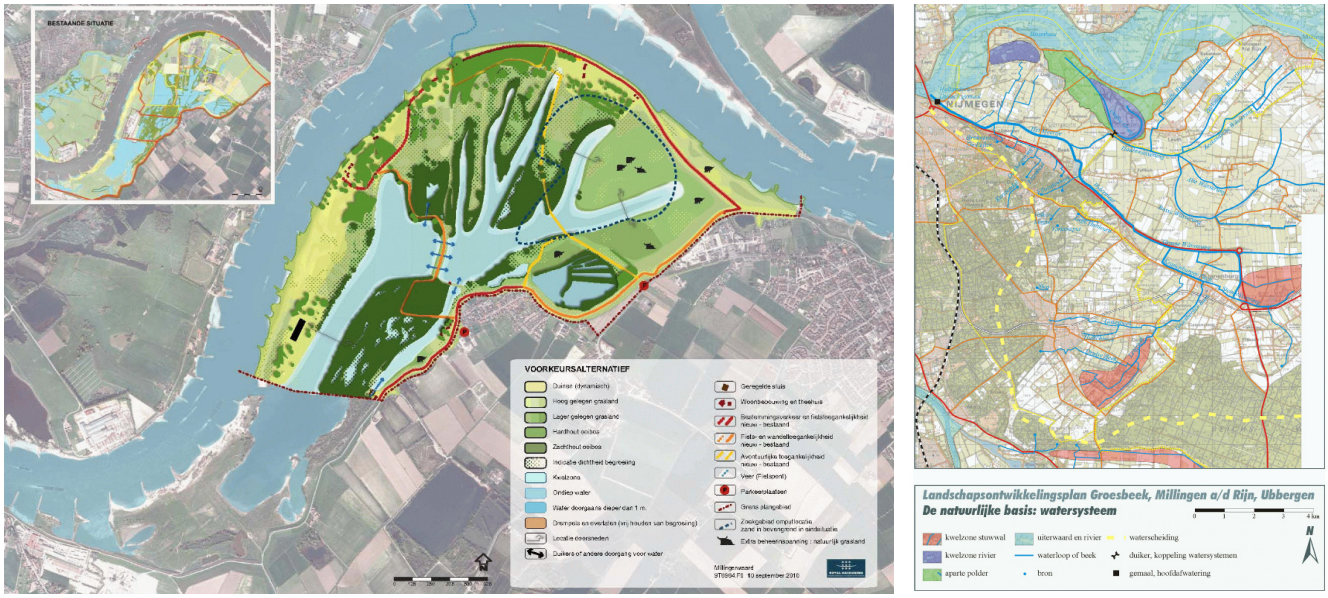

Figure 102, 103. Extracts from the Landscape Development Plan (Bergen Dal Landschapsontwikkelingsplan...)

Aesthetic Quality Framework and Regulatory Plan (Welstandsbeleid en Welstandsnota)/ the Netherlands – A regulatory framework setting out criteria for the aesthetic quality of landscapes and buildings at the municipal level. The document is binding for building permits, equivalent to the existing TIAN in Latvia. The document consists of an analysis of the existing regulatory framework and references, as well as an assessment of the existing aesthetic values; a strategic vision that includes the aesthetic values and specific aspects of the site; clearly defined quality criteria. The document includes precise instructions (materials, colour tones, textures, etc.) for the design and layout of buildings and landscaping.

Figure 104. Guidelines for a system of environmental quality criteria (Handreiking Adviesstelsel omgevingskwaliteit)

Landscape planning and management tools in Switzerland

The Swiss approach to landscape planning is participatory, and the Landscape Development Plan brings together local authorities, industry professionals, stakeholders and the organising committee that manages the whole process.

Landscape Development Plan (Conception d'evolution du paysage) is a participatory planning document. It is a voluntary document that incorporates aesthetic and ecological aspects of landscape planning and is essentially a participatory spatial planning tool aimed at planning, supporting landscape projects, highlighting landscape qualities and managing the landscape. Following the recommendations developed, the document should include an analytical part – an assessment of the landscape, identifying priority issues; a development vision and defined quality objectives to be achieved in the future; foreseeable landscape changes, analysis of changes; coordination and cooperation plan between stakeholders; monitoring tasks and provision; analysis and plan of funding resources.

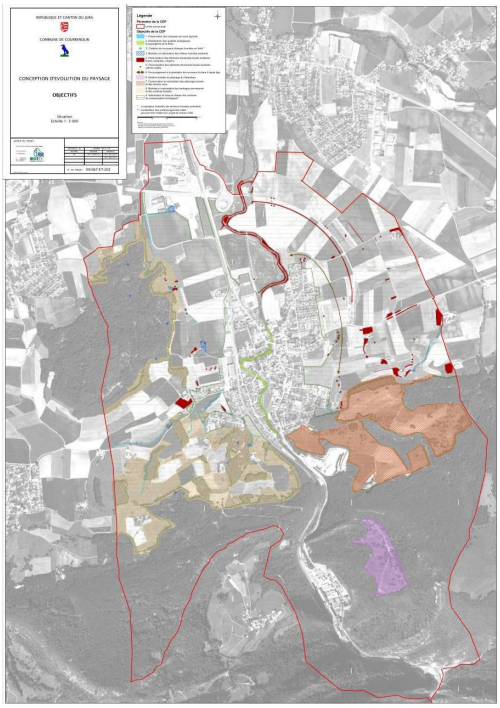

Figure 105. Example of a landscape development plan (Example de plan de synthèse...)

LANDSCAPE PLANNING AND MANAGEMENT TOOLS IN BELGIUM

In the Walloon region of Belgium, landscape planning and management has been activated through the partnership's voluntary Landscape Programme. The Landscape Programme contains recommendations for the conservation and improvement of the quality of the landscape, in accordance with the economic, ecological and aesthetic aspects and characteristics of the region.

Landscape Programme (Programme paysage)/ - active involvement of local communities (groupe d'action locale, GAL) and NGOs. A voluntary planning tool aimed at identifying landscape values and development potential at the inter-municipal planning level, as well as defining specific landscape management measures. The document includes an analytical part; strategic objectives; agreements and cooperation plans for the implementation of landscape management; a plan of actions and measures, taking into account the interests of the stakeholders involved. The recommendations part includes detailed technical solutions and cartographic material.

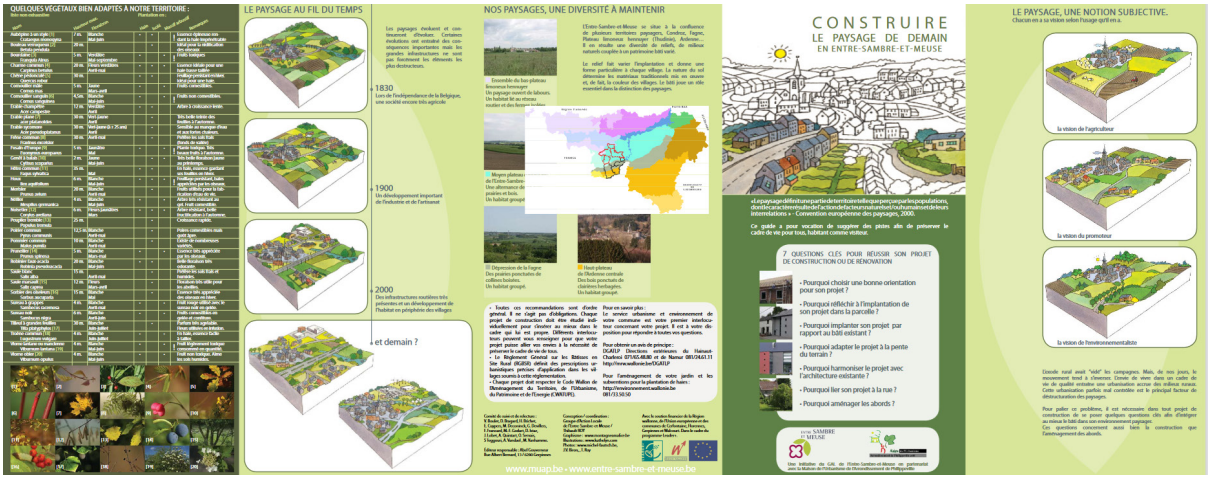

Figure 106. Landscape programme materials (Construire le paysage…)

LANDSCAPE PLANNING AND MANAGEMENT TOOLS IN GERMANY

Germany has a highly hierarchical document structure, which allows for a very sequential progression from strategic objectives to actions and a funding model implemented at the local level directly through the Landscape Plan as a document. **Landscape Plan** (Landschaftsplan)/ Germany – Participation of local authorities, public, land owners and managers, NGOs, other stakeholders; organisation of various involvement events. Landscape plans are integrated into the basic plans for urban and rural development (Bauleitpläne), are a voluntary initiative of local authorities and are designed to preserve, restore or plan the development of an area at a local level. The plans define the boundaries of the landscapes and the objectives for each landscape unit. The document has been prepared in accordance with the guidelines and includes a landscape inventory – descriptions and cartographic material, descriptions of protected areas; specific regulations governing land use, subsoil extraction procedures and conditions; objectives and action plans aligned with the spatial planning action plan.

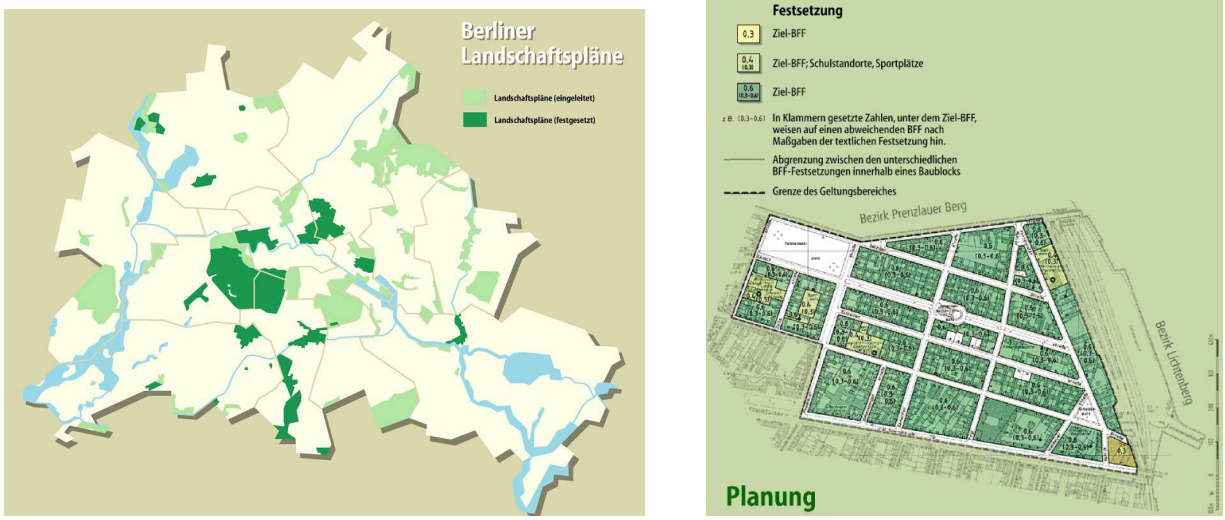

Figure 107. Berlin Landscape Plan (Berlinier Landshaftsplan; Berlinier Landschaftsplanverfahren)

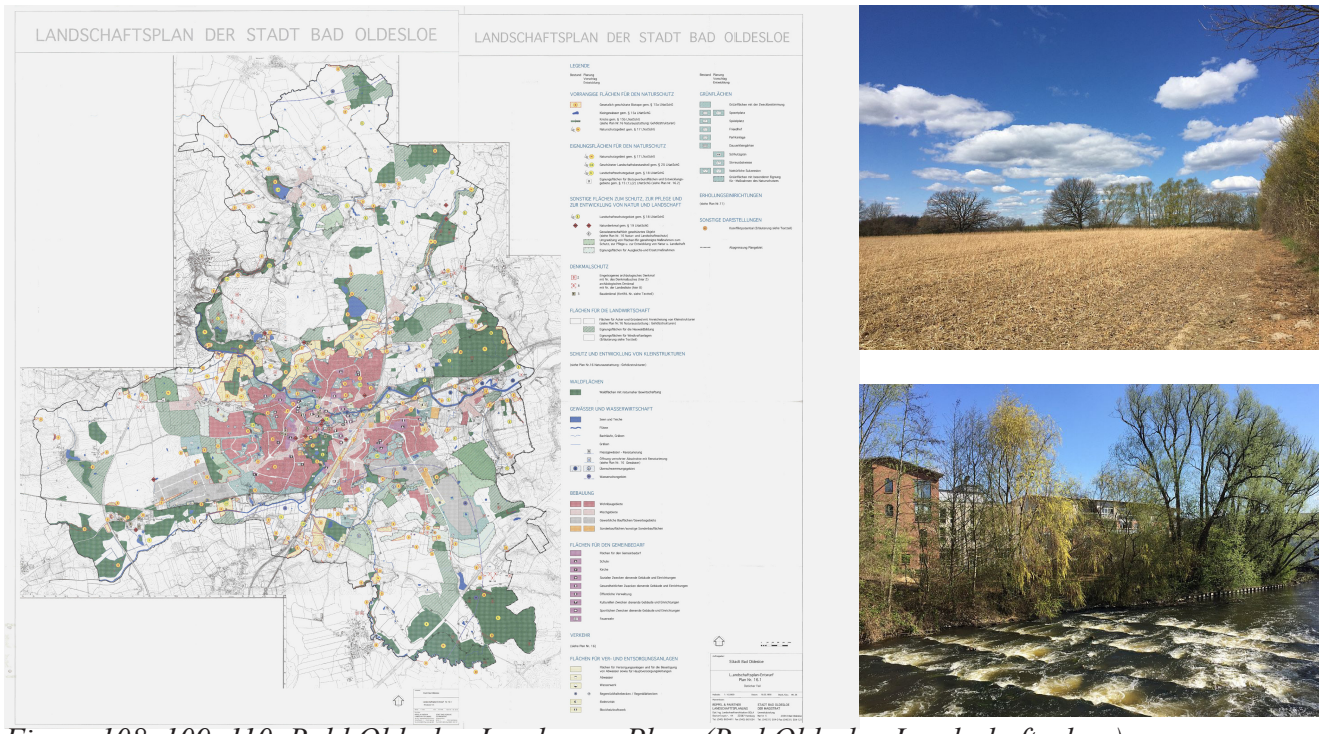

Figure 108, 109, 110. Bald Oldesloe Landscape Plan (Bad Oldesloe Landschaftsplan)

Interdisciplinary fields, such as landscape planning, are complex and are often carried out on an experimental basis. A major shortcoming is the under-assessment of governance aspects and planning structure, and there is still a gap between funding sources, justification and researcher results. A variety of tools have been used as landscape planning and management tools in Europe, all with different objectives, but all of them are specifically landscape planning tools.

In general, the experience of each country varies, both in the levels of planning and in the types of documents and related actions and measures implemented. Public involvement and understanding of regional differences in the landscape is a key aspect to be included in planning and management. The ecological landscape planning approach and the aesthetic values of landscapes are relevant. Despite the diversity of the documents and the broad coverage of landscape aspects, there are issues of continuity in the implementation and the process of coherence between the individual documents, which is most clearly reflected in the implementation of the hierarchical structure of landscape planning in Germany, but is not clearly reflected in the other countries studied.

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EXAMPLES OF INTEGRATED PLANNING OF NATURAL RESOURCES IN THE CONTEXT OF TERRITORIAL AND TOURISM DEVELOPMENT

Natalija Ņitavska and Daiga Skujāne

Integrated planning of natural resources in the urban environment can bring not only ecological but also economic and social benefits. This is also demonstrated by various territorial development projects in Europe and Latvia.

URBAN FOREST PROJECT – A WORLD-CLASS METHOD

The method developed by Miyawaki works worldwide, regardless of soil and climate conditions. More than 2000 forests have been successfully created using this method. Akira Miyawaki, PhD, botanist and professor, invented the technique in 1980. He is the 2006 recipient of the Blue Planet Prize, the equivalent of the Nobel Prize for Ecology. The methodology can be used to create local urban forest ecosystems much more quickly. The method is inspired directly by the processes and diversity in nature: a total of 15 to 30 different species of trees and shrubs are planted together. This plant community works very well together and is perfectly adapted to local weather conditions. A biotope created in this way will become more complex over time and attract a high biodiversity. The vegetation becomes much denser than conventional plantations and has the structure of a mature natural forest. It is a multi-storey structure, showing different levels of vegetation. A forest structured in this way provides many benefits in the form of ecosystem services.

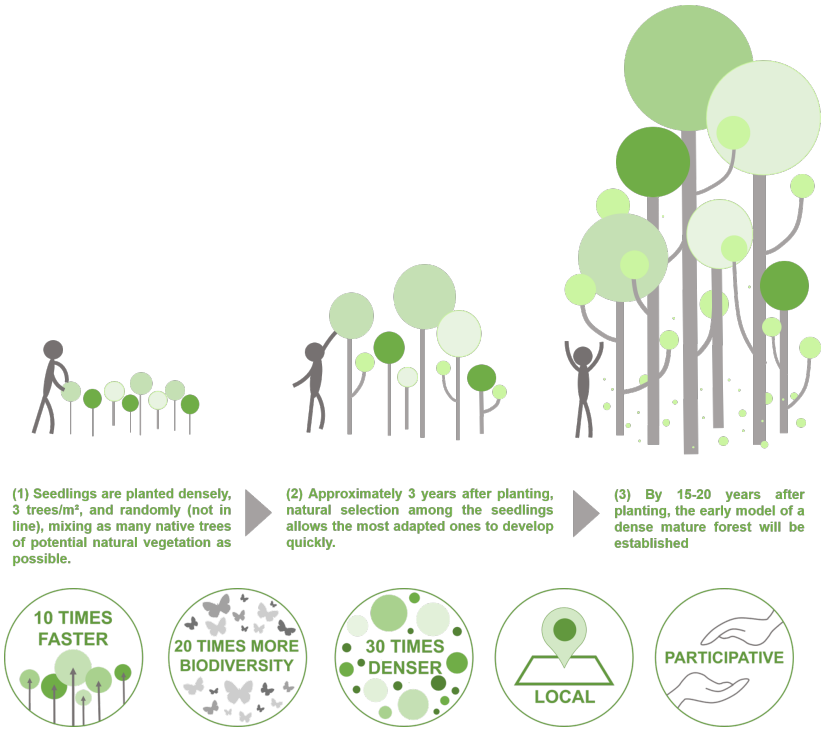

Figure 111. Key principles and benefits from the Miyawaki method implemented within the Urban Forest project (Miyawaki method)

Urban forest planting with this methodology has already been carried out in many European countries with the help of volunteers. Below are some examples of completed projects.

Figure 112, 113. Examples – Belgium – Herstal and Puurs (Miyawaki method)

Approaches to integrated natural resource planning:

- Use of indigenous tree species for forest creation
- Building a diverse forest structure (biologically, spatially and structurally)
- Public participation

Benefits:

- Faster establishment of a mature forest structure
- A more stable and climate-resilient urban forest structure
- Biodiversity improvement
- Educated society

The **promenade along the Ogre River** is a popular place for walks among locals and visitors alike. The promenade is also used to organise festivals and concerts. The renovated promenade is about 2 km long, offering views of both the Ogre River landscape and the hillsides. At the beginning of the promenade there is a pedestrian bridge across the Ogre River, built in 1966 – the largest arch-type bridge in Latvia. Since 2017, wooden footbridges have been installed across the Ogre River during the ice-free period for a length of 100 metres, reviving the atmosphere of the bathing resort in Ogre of the 1920s and 1930s. Infrastructure development on the banks of the Ogre River is ongoing.


Figure 114, 115. Ogre River promenade (photo by authors)

Approaches to integrated natural resource planning:

- River promenade as an ecological and functional urban corridor that fits into the overall green infrastructure
- Preservation of natural coastal vegetation
- Incorporation of new landscaping elements into the riverscape. Environmentally friendly materials
- Creation of a multifunctional and educational public outdoor space, including an audio guide

Benefits:

- Access to water resources in an urban environment
- Functionally and ecologically connected urban green structures
- Healthy and educated society

Pedestrian promenade and centre square with sustainable stormwater solutions in Ogre (Brīvības Street). Brīvības Street in Ogre is not only a pedestrian street with modern elements, but it is also surrounded by examples of architecture from the 1920s–1930s, most of which are architectural monuments of national or local importance. The pedestrian street is a stylised representation of the winding course of the Ogre River with islands represented by flowerbeds.

The square, landscaped at the beginning of the pedestrian section of Brīvības Street, has become a popular gathering place for residents and visitors of Ogre, both on a daily basis and on various festivals. The new urban objects – a digital fountain ("Sun Gate") and a stage – complement the overall image of the city. The square hosts local music, art, sports and other entertainment events. The pedestrian street is completed by the sculpture "The White Wagtail" by sculptor Jānis Karlovs. Near the pedestrian street there is also a feature popular with children – Eric the Teddy Bear.



Figure 116, 117, 118. Pedestrian promenade and centre square (photo by authors)

Approaches to integrated natural resource planning:
- Sustainable stormwater management solutions through open systems, adapting to periods of heavy rainfall
- Integration of the Ogre River theme in the landscaping
- Greener development of the city centre, creating ecological and functional links between the city's larger green structures – parks and squares
- Creating a multifunctional public open space

Benefits:
- Urban environment which is more adaptive to climate change
- Functionally and ecologically connected urban environment
- Strengthened identity of the place and the link with the Ogre River
- Educated and active society

Since 2004, the **Ogre Blue Hills Nature Park** has been a specially protected area of 312 ha. Most of the park is covered by coniferous forests on a series of hillocks that are part of the Great Kangari Hills. It is home to a variety of flora and fauna: eighteen plant, six bird and several insect protected species. The park has walking, educational, cycling and cross-country skiing trails, which are open to Nordic walkers, cyclists and other active recreation enthusiasts during the snow-free season. The Dubkalni Reservoir in the park's territory has particularly clean and clear water, and there are several recreation areas by the water. In 2013, a 30-metre-high observation tower was opened in the park. From 1 January 2014, the Ogre Blue Hills Nature Park and the adjacent urban forest territory have been managed by the Ogre and Ikšķile municipalities' agency "The Development Agency of the Tourism, Sports and Recreation Complex 'Blue Hills'".


Figure 119, 120. Ogre Blue Hills Nature Park (photo by authors)

Approaches to integrated natural resource planning:
- Creating environmentally friendly infrastructure that respects nature's values. Environmentally friendly materials for road surfaces and landscaping elements
- Controlling erosion and trampling by creating wooden footbridges, landscaped recreation areas and car parks
- Revitalisation of a former mineral quarry and a degraded area
- Creation of a multifunctional public open space, providing active and passive leisure opportunities at different times of the year (ski slope, winter swimming, picnic areas, walking routes, thematic events, etc.)
- Audio guide and information boards for public education

Benefits:
- Reduced anthropogenic impact on natural values
- Revitalization of degraded territory
- Multifunctional use throughout the year
- A natural area close to the city
- Educated and active society

Near Olaine there is a **public recreation area and beach at Līdumu quarry**, around which there is a walking route of just over 2 kilometres. The walk is mainly on existing paths, but there is also a wide wooden footbridge on one side of the quarry, which is often used by anglers. There are several seating areas with tables, barbecues and other equipment, many footbridges for anglers and a large children's play area/playground. There are wooden pontoons, a walking trail, sun loungers, picnic areas with barbecues, a playground, volleyball net, football goal, basketball hoop, slide, and a wakepark. The nature trail around Līdumu quarry is approximately 2.8 km long and is accessible with a stroller.

Figure 121, 122. Līdumu quarry (photo by authors)

Approaches to integrated natural resource planning:

- Access to water resources, footbridges along the banks of the water body, development of recreational facilities (both for active and quiet recreation), respecting the existing natural values
- Developed cycle path from Olaine, creating an easily accessible nature area
- Revitalised former mineral quarry site
- Multifunctional open space

Benefits:

- Natural and water resources easily accessible by car or bicycle for inhabitants of nearby settlements
- Natural values and diversity preserved
- Healthy society

Olaine Forest Park is a place where there is a naturally growing pine forest with a well-maintained environment, right in the centre of the town. Entering the park from Veselības Street, you will find yourself on the promenade, which serves as a good landmark in the park. Walking along the promenade, on the right side there is a place especially for young people called "Popcorn Square". It has a small stage with spectator benches, hammocks, outdoor table tennis and a book exchange point. The park also has an open-air stage, which attracts residents and visitors alike from May to September for various cultural events and open-air cinema screenings. Several shelters and outdoor barbecues have been built right next to the promenade for the convenience of holidaymakers. Those who enjoy outdoor activities will love the outdoor fitness equipment, while children can try their hand at the "Forest Cat" track, toughen their feet on the Barefoot Trail or visit the children's playground in the Forest Park. The playground is a rubber-surfaced area of more than 800 square metres, featuring a terrain-climbing roller coaster with slides, climbing frames, trampolines, crawling holds, ropes and other activities.



Figure 123, 124, 125. Olaine Forest Park (photo by authors)

Approaches to integrated natural resource planning:
- Conservation of existing natural assets in the urban environment through harmonious integration of landscaping and infrastructure
- Multifunctional and creative public open space for different interest and age groups
- Outdoor elements to encourage socialising (shelters, playground, sports area, cultural area, etc.

Benefits:
- A natural and biologically valuable urban area
- Socialising and activity-encouraging public open space

In 2018, the Firs**t World War History Discovery Route was opened in Olaine**. The route is located in the area around which the Russian army defensive line was located during the First World War. Every resident and visitor of Olaine municipality can see the newly built authentic bunker (Russian army defence structure), which was built on its original location, a fragment of a firing tower and a memorial to the heroes of the Freedom Struggles and the First World War. In October 2020, a Russian army fortification element – a dugout (a rectangular subterranean dwelling with a log roof covered with turf) – was completed on the route, as well as a stylised reinforced concrete showcase – a cupboard, which houses the objects found during the archaeological excavations – was made. Visitors on this route can learn interesting facts about this period and its events.



Figure 126, 127, 128. First World War history discovery place (photo by authors)

Approaches to integrated natural resource planning:
- Historical educational object integrated into the natural environment, preserving natural values
- Public education elements

Benefits:
- The natural area has been given an educational and historical function
- Preserved natural area in urban environment

The pedestrian road and viewing terrace in the Recreation Park in Valmiera are designed according to the principles of universal design, which provides easy access to the Gauja River and recreational infrastructure. Visitor traffic is channelled through the constructed structures, thus contributing to the protection of nature and biodiversity. In front of the terrace, closer to the Gauja River, a bench grows out of the boardwalk as the terrain changes. At the back of the terrace, a seating area gradually transforms from a bench into a couch. The terrace is raised from the ground, as part of the landscaped area is likely to flood. The viewing terrace and part of the pathway are made of sustainable pine wood constructions that are friendly to human health and are finished with larch planks from Siberia, which are very durable in the Latvian climate.


Figure 129, 130. Viewing terrace by the Gauja River (Ēriks Božis, 2019; photo by authors)

Approaches to integrated natural resource planning:
- A viewing platform harmoniously integrated into the natural environment with access to the water, using environmentally friendly materials, element design
- Accessibility for people with reduced mobility

Benefits:
- Established access to water resources, easily accessible to residents and visitors of the town
- Preservation of the natural environment along the river banks
- The viewing platform serves as a recognisable element of the place
- A place to socialise for different interest and age groups

Gauja Steep Bank Park of Senses and walking trails in Valmiera. The Park of Senses includes several areas/activities – a barefoot trail, a tree trail, a net cube, a jogging and Nordic walking track, and Daliņš Beach. Tree trail is the safest of its kind with a continuous safety system! It is a 1.5 km long, 5–11 metre high challenge, with 4 rope descents across the river. There are several marked trails of different lengths in the vicinity of the Gauja Steep Bank Park of Senses and Jānis Daliņš Stadium. Athletes and outdoor enthusiasts can choose the route that suits them best and easily keep track of their distance with kilometre markers. The tracks are free to use for training, hiking and various themed events.


Figure 131, 132, 133. Park of Senses in Valmiera (photo by authors)

Approaches to integrated natural resource planning:
- Preservation of natural forest areas in the urban environment, maintaining high biodiversity
- Incorporation of existing natural elements and structures into the park's activity areas (tree trail, walking trails with views of the Gauja River, etc.)
- Creation of a multifunctional area for different interest groups and ages
- Use of environmentally friendly materials in road surfaces and landscaping elements

Benefits:
- A biologically and functionally diverse natural area in an urban environment
- Educated and active society

The aim of the development of the **Gauja bank promenade** area is to develop the banks of the Gauja in Valmiera, from the Kazu rapids to the narrow-gauge railway bridge over the Gauja, into an important landscape space for the town with a diverse and lively public open space, which has a history and nature-respecting character and urban identity. Nowadays, the rapids are a rowing slalom course. The Gauja Tram is a floating vehicle for sightseeing and pleasure trips on the Gauja. It runs in summer from May until the beginning of October. Herb and medicinal plant beds in the Valmiera Museum area, on the banks of the Gauja River, are dedicated to pleasure, health and beauty. During the Hanseatic period, thyme, oregano, rosemary, hyssop, sage, basil were brought here with ships to stay – there are about 150 different plants in the beds, but more typical of Latvia.


Figure 134, 135. Gauja bank promenades (Valdmieras Tūrisma informācijas centrs,photo by authors)

Approaches to integrated natural resource planning:
- Preservation of a natural riverbank in an urban environment, maintaining high biodiversity
- Creating a well-arranged access to the Gauja river
- Creation of a creative public outdoor space, encouraging the cooperation of various groups of society

Benefits:
- A biologically and functionally diverse natural area in an urban environment
- Available water area
- An educated and healthy society

With the support of Latvia's State Forests, the **Ģīme nature trail** was created in the territory of the Valmiera State Gymnasium. By planting almost 400 different species of trees and shrubs, a nature trail has been created in the territory of the Valmiera State Gymnasium, which is also one of the first "oxygen forests" in the urban environment. The 120-metre-long nature trail was created as part of the pan-Latvian tree sowing and planting campaign "Oxygen". The trail was later expanded to allow anyone to visit and learn more about various topics related to geology, geography, astronomy, history and biology. Various amenities have been built along the entire length of the trail – a viewing platform, a footbridge for exploring aquatic life, and a boat landing. The trail uses modern technologies such as QR codes, which can be scanned with a smart device to get more information about what you can see, hear and touch on the trail. You can also submit your own collected information at two stands.

Figure 136, 137. Ģīme nature trail (photo by authors)

Approaches to integrated natural resource planning:
- Preservation of existing natural shorelines, enhancing the biodiversity of the site
- Access to water and natural elements through walking paths, wooden footbridges and waterside terraces
- Incorporation of existing natural features as educational objects in the theme of the trail, linking with nearby schools and their activities
- Participatory information stands and amenities (e.g. water sampling, exploration of local flora and fauna, green classroom, etc.)

Benefits:
- Preserving a biodiverse natural area in an urban environment
- Natural resources accessible to all in an urban environment
- Educating the public about local plant and animal species, natural and topographical conditions

Saulkrasti Beach and recreational infrastructure. A 17 km long "pearl of nature". Look for diversity in the singing sands of Lilaste and the rocky coastline of Zvejniekciems. Marine Park – by continuing the old resort traditions, the swimming area "Centre" which features the blue flag was established in Saulkrasti town. The Marine Park invites visitors to enjoy sunsets in comfortable sun loungers and use the play equipment, outdoor fitness equipment, street gym and beach volleyball courts. Everyone is invited to combine leisure activities with healthy and sporty activities. In the Marine Park, all the decking is made entirely of wood. Benches, bike racks, rubbish bins and sun loungers are all specially designed.


Figure 138, 139. Saulkrasti Beach (photo by authors)

Approaches to integrated natural resource planning:
- Creation of a multifunctional nature area
- Use of environmentally friendly materials (wood)
- Erosion-reducing landscaping features (footbridges, etc.)

Benefits:
- Accessible coastal natural area
- Improving the health of the population
- Place recognition element

The White Dune and integrating environmental education into the infrastructure of nature objects. The White Dune is located on the right bank of the Inčupe River, at the mouth of the river, and offers a beautiful view of the Gulf of Riga. The 18-metre-high dune on the right bank of the Inčupe River at the mouth of the river is an excellent vantage point from which to view the Gulf of Riga. In Saulkrasti, at the White Dune, there are several interesting environmental objects that encourage people to listen and look more closely at nature. Hedgehog Mum Frieda and Fredis the Bunny friendly encourage visitors not to litter and to go in nature quietly – without making noise. The Insect Path draws attention to the fact that we are surrounded by very active life every day – a variety of insects that we often don't even notice. And a listening device – a specially designed horn – lets you listen to the sound of sea waves and pine trees. Information boards and signs provide information about the natural values of the area and the formation of the White Dune.


Figure 140, 141, 142. The White Dune in Saulkrasti (photo by authors)

Approaches to integrated natural resource planning:

- Preservation and protection of natural elements, maintaining the site's biodiversity by creating erosion and trampling mitigation features (footbridges, landscaped rest areas, fencing and branch revetments to protect slopes from trampling)
- Elements to facilitate coastal accessibility
- Use of educational, easy-to-read environmental objects and information boards to educate the public

Benefits:

- Natural resources accessible to the public
- Maintaining of biodiversity
- Educated society

Krasta Street along the Rēzekne River in Rēzekne forms the missing link between the historical part of Rēzekne and the new part - the Olympic Center, as well as the accessible Rēzekne River for city residents and guests. Along with the physical connection, a connection is also formed between history and the future, between nature and the urban environment. Several recreation areas by the Rēzekne River, memorials and environmental objects, as well as a street route, complement the city sightseeing opportunities accompanied by a digital audio guide. Krasta Street has already become a creative space where various events take place, for example, at the "Seven Hills" art and music festival, Krasta Street became one of the main stages of the interactive walk. Installations, exhibitions and activities could also be observed during the city's festivities. Local residents got involved in the creation of rain gardens on Krasta Street, thus creating a closer connection with the city, as well as learning about the sustainable management of rainwater in cities.

NACIONĀLAIS ATTĪSTĪBAS PLĀNS 2020
EIROPAS SAVIENĪBA
Eiropas Reģionālās attīstības fonds
IEGULDĪJUMS TAVĀ NĀKOTNĒ

The project was implemented within the European Union Fund project No. 3.3.1.0/19/I/007 "Improving the range of cultural tourism products for the promotion of tourism business in the historical center of the city". The aim of the project is to increase the amount of private investment in the city of Rēzekne, by making investments in business development in accordance with the economic specialization of the territories determined in the municipal development programs and based on the needs of local entrepreneurs.

Figure 143. The beginning of the construction of Krasta Street, which will connect the city center with the active part of the Olympic Center (Krasta ielas pārbūve, 2020)

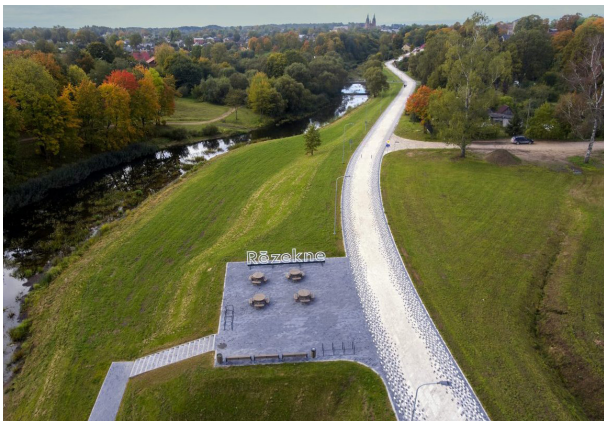

Figure 144. Krasta Street becomes a space of creativity and co-creation for various celebrations and events (Krasta iela nodota..., 2021)

Figure 145. Rain gardens at Krasta Street, which will help drain, accumulate and purify rainwater in an environmentally friendly way (Pateicoties skolēniem..., 2021)

Figure 146. Krasta Street becomes a space for creativity and co-creation during various celebrations and events (Pabeigti būvniecības darbi..., 2021)

Approaches to integrated natural resource planning:

- Easy access to Rēzekne River (water resources) in the urban environment is ensured
- Creation of a multifunctional area
- Involvement of the territory in the overall green infrastructure of the city and tourist routes
- Use of environmentally friendly solutions (rain gardens)
- Riverside erosion mitigation elements (gabions, etc.)
- Citizen participation and education within various activities (creation of rain gardens, city celebrations, etc.)

Benefits:

- The Rēzekne river is available
- Improving the physical and mental health of the population
- Educated society
- An element of place recognition

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EXAMPLES OF GOOD PRACTICE IN PUBLIC INFORMATION AND INVOLVEMENT

Madara Markova

There are many options for disseminating information; the most important is to assess the target audience and choose the most appropriate dissemination tool. There is a new information tool that is nowadays more often placed in the premises of local authorities, but can be placed in different locations around the city, ensuring accessibility at the right time for everyone. The digital information kiosks provide up-to-date information, the opportunity to express your opinion and take part in surveys. The use of such kiosks, with a simple and clear appearance, ensures that the part of society that does not use computers or the internet on mobile devices on a daily basis also participates.

Figure 147, 148. Example of an information kiosk (A bite-sized guide...)

The project "Participative city mobile application development", established in Tartu in 2013, was designed to develop a methodology to maximise the engagement of the city's citizens with a user-friendly mobile application. The project included a public survey, interviews with both municipal and community representatives, mapping of mobile app usage, development of navigation schemes, as well as prototyping and testing. Crucially, citizens were involved in the development of the tool, not just using the ready-made mobile app. 200 citizens took part in the development process. A similar project was implemented in Tallinn to promote citizen participation and co-creation by offering a simple way to give feedback on various development plans. The AvaLinn app – AvaLinn meaning "open city" – was launched in January 2018 and has been piloted in the Skoone Bastion area for planning to collect a number of ideas.

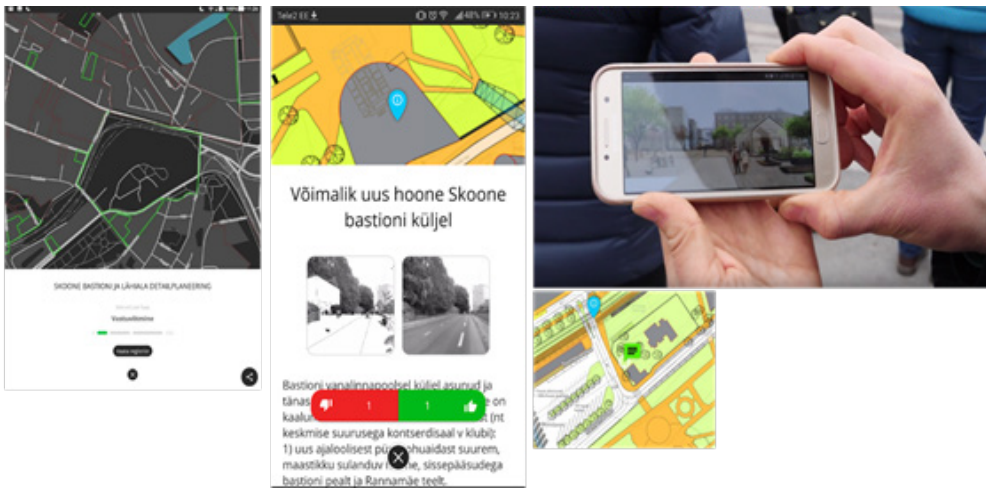

Figure 149. Example of app development and use in Tallinn (Stakeholder involvement app..., 2018)

FOCUS GROUP INVOLVEMENT

Focus group engagement can be very challenging. Basically, what is needed is research on the group itself and the possible ways to reach it, as well as the means needed to raise interest. In the Pori city centre development project, a temporary office in the respective building block was organised for the residents' input, tea and snacks were offered and the residents were invited to talk and share their thoughts.



Figure 150, 151, 152. Stakeholder-led development planning for the city centre of Pori, Finland (Pori-Porin keskustan...)

A similar example of a temporary office was used within the Gauja development project "Plan the Gauja" in Cēsis. In addition, the focus group research revealed that many active residents of Cēsis work and are based in Riga on weekdays, hence the temporary office was set up in Riga.




Figure 153, 154, 155, 156, 157. "Plan the Gauja" temporary office (Gaujas upes telpiskās..., 2020)

Citizens' involvement may also vary according to the most typical problems. For example, there is often confusion among citizens about how to spend money on a project. In Orebro, this problem was addressed by organising "Citizens' Budgeting for River Access Development", where citizens were not only asked to provide ideas for river access development, but also to make calculations for river access construction.

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