National Landscape Strategy (2017-2026)

Written under the coordination of
the Department of National Parks and Landscape Protection, Ministry of Agriculture

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1 Introduction

Landscape is interpreted by the National Landscape Strategy (NLS) as defined in the **European Landscape Convention** (hereinafter: Landscape Convention). Accordingly, **landscape** means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors. The landscape is an important part of the quality of life for people everywhere: in urban areas and in the countryside, in degraded areas as well as in areas of high quality, in areas recognised as being of outstanding beauty as well as everyday areas. In this context, degraded, deteriorated/ruined landscapes are just as much part of the Strategy as protected landscapes with high value or non-protected landscapes. The quality and diversity of European landscapes constitute a common resource. One of the basic tasks of NLS is to call society's attention to landscape and sharpen its sense of responsibility in order for stakeholders to cooperate on the local, national and international level for the **protection**, **management** and **planning** of Hungarian and transfrontier landscapes. In line with the spirit of the Convention, this Strategy sets goals and tasks by using three instruments of protection-management-planning.

- **Landscape protection** means actions to conserve and maintain the significant or characteristic features of a landscape, justified by its heritage value derived from its natural configuration and/or from human activity.
- **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.
- **Landscape planning** means strong forward-looking action to enhance, restore or create landscapes.

In drafting the Strategy, the entire administrative area of settlements, including the water bodies are considered to be part of the landscape in accordance with the Convention.

Landscape is a basic component of the natural and cultural heritage that contributes to the formation of local cultures and to human well-being and has a significant role in the development and consolidation of national and local identity. In addition to its public interest role, (in the cultural, ecological, environmental and social fields), it also constitutes a resource that is favourable to economic activity and whose protection, management and planning can contribute to job creation. Developments in agriculture, forestry, industry, raw material extraction, energy and in regional planning, town planning, transport, infrastructure, tourism and recreation and, at a more general level, changes in the world economy are accelerating changes in landscapes. Landscape is not static but it is a continually changing system. Changes are caused by both natural and human factors. We are responsible for the roles the changes in the landscape caused directly or indirectly by human activities will have in society's well-being or in the evolution of its well-being. Therefore **the protection, management and planning of the landscape entail rights and responsibilities for everyone.** Land use based on a balanced and harmonious relationship between social needs, economic activity and the environment is the basis for sustainable development.

In the European Landscape Convention[1], the Council of Europe specified the general and specific measures it expects its Member States to perform. It set the framework for the landscape policy of the nations. The Parties are expected to:

- establish and implement landscape policies aimed at landscape protection, management and planning;
- establish procedures for the participation of the general public, local and regional authorities and other parties with an interest in the definition and implementation of landscape policies;
- integrate landscape into their regional and town planning policies and into their cultural, environmental, agricultural, social and economic policies, as well as in any other policies with possible direct or indirect impacts on landscape;
- increase awareness among civil society, private organisations, and public authorities of the value and role of landscapes;
- promote trainings for specialists in landscape appraisal and operations;
- promote multidisciplinary training programmes in landscape policy, protection, management and planning, for professionals in the private and public sectors and for associations concerned;
- promote school and university courses which address the values attaching to landscapes and the issues raised by their protection, management and planning in their relevant subject areas;
- make an inventory of landscapes (identify the landscapes throughout their territories);
- analyse the landscapes based on their characteristics and assess the impacts that exert changes in the landscapes;
- keep records of changes in the landscapes;
- assess the landscapes thus identified, taking into account the particular values assigned to them by the interested parties and the population concerned;
- set quality objectives for the landscapes identified and assessed;
- provide each other scientific and technical assistance in landscape matters through the pooling and exchange of experience and through the results of research projects;
- promote the exchange of landscape specialists in particular for training and information purposes;
- exchange information on all matters covered by the provisions of the Landscape Convention;
- encourage transfrontier co-operation on local and regional level and, wherever necessary, prepare and implement joint landscape programmes.

The tasks related to landscapes require a horizontal approach and intervention. From the aspect of sustainability, the tasks related to landscapes exist within one system and therefore only systematic solutions can be made. At the beginning of the implementation of the Landscape Convention, tasks were allocated in a fragmented government structure and sector. Nevertheless, not handling the tasks in a complex way is inefficient. NLS can adequately satisfy the expectations only if the currently missing horizontal aspects are integrated into the policies upon their upcoming review and a complex, holistic approach is adopted.

The objectives of the policy documents developed in the past years by the different sectors have not always taken into account the characteristic features of the different parts of the

[1] CET No. 176 European Landscape Convention adopted by the Committee of Ministers of the Council of Europe on 19 July 2000 and opened for signature by its Member States in Florence on 20 October 2000

country or landscapes, and have not paid full attention to the spatial structure of the country. As a result, the principle of territoriality is sometimes underrepresented in the sectoral policies (National Development and Territorial Development Concept - NDTC).

Therefore, it is crucial to include the landscape policy expected to be developed by the Parties and to integrate the protection, the management and the planning of the landscape in a single strategic document on the landscape.

1.1 Background and authorizations

In Hungary, the Landscape Convention (Act CXI of 2007 on the promulgation of the European Landscape Convention dated in Florence on 20 October, 2000) took effect on 1 February, 2008. The minister responsible for nature conservation shall provide for the implementation of the Landscape Convention in agreement with the minister responsible for cultural heritage protection and in cooperation with the minister responsible for territorial development and spatial planning.

The primary responsibility for the local implementation of the Landscape Convention lies with the Ministry of Agriculture (hereinafter: FM) being responsible for nature conservation. Under its management, a *joint work programme applying to all ministries concerned* (at the time: VM, EMMI, BM, NFM) was drawn up in order to achieve the goals and fulfil the tasks laid down in the Landscape Convention. The document entitled *Munkaprogram az Európai Táj Egyezmény végrehajtására* (2013–2017), (Work Programme for the Implementation of the European Landscape Convention (2013-2017)), (hereinafter: Work Programme), that was commented on by the Európai Táj Egyezmény Szakértői Testület, (Hungarian Expert Board of the European Landscape Convention - hereinafter: HEBELC) set the development of the Hungarian landscape strategy as an "extremely important" task. In its position paper, HEBELC determined that the future landscape strategy should be a medium term national strategy corresponding to the goals of the Landscape Convention, (including the protection, management and planning of landscapes), and should be drawn up with inter-ministerial cooperation. FM initiated the development of the strategy at the time of the formulation of the National Environmental Programme to implement this task. In June 2015, the National Assembly approved the 4th National Environmental Programme, (Decision 27/2015 (17 June) of the National Assembly on the National Environmental Programme for the period between 2015 and 2020). The development of the "*National Landscape Policy and Strategy Integrating the Protection, Management and Planning of Landscapes*" is stipulated in Chapter *8.7. European Landscape Convention* of the Nature Conservation MasterPlan annexed to the Programme.

Government Decision 1567/2015 (4 September) on the action plan for the restructuring of construction affairs and the associated tasks required the development of a National Urban Policy in line with the *National Landscape Strategy being drawn up*.

Workflow: As the first step of developing the landscape strategy, the European Landscape Convention National Co-ordination Working Group (ELC NCWG), arranged the participation of the ministries responsible for the implementation of the Landscape Convention in Hungary, and organised an extended meeting by inviting all members of HEBELC in March 2015. The participants of the meeting outlined strengths, weaknesses, opportunities and threats without in-depth debate and full consensus. The abridged document was forwarded electronically by

FM to all invited participants for comments. Based on the comments received, it made a SWOT analysis.

On 2 December, 2015, a workshop on the proposed National Landscape Strategy to be developed was organised jointly by the Office of the Commissioner for Fundamental Rights and the State Secretariat for Environmental Affairs, Agricultural Development and Certified "Hungaricum" Treasures, FM. The workshop focused on two topics:

- the analysis and evaluation of the condition of the Hungarian landscape;
- the role and responsibility of public administration in landscape formation.

The event created the opportunity for research institutions, universities and civil organisations to make proposals regarding the National Landscape Strategy in order to safeguard the nation's common heritage. The participants could also send their comments in writing.

On 11 December, 2015 the FM proposed the convocation of an intra-ministerial and an inter-ministerial working group for the constructive implementation of this task. The technical preparatory work relied on a wide-ranging technical and inter-ministerial cooperation.

Technical fields participating in the preparatory work	
FM	landscape protection, nature conservation, environmental development, environmental protection, land affairs, agricultural development, agriculture, forestry
EMMI	higher education
BM	water management, National Water Strategy
NGM	territorial development planning, territorial planning
ME	heritage values, protection of archaeological heritage, World Heritage, spatial planning, settlement affairs
NFM	energy management, mining
MFGI	raw minerals, geological agents
OVF	water management, National Water Strategy

1.2 The policy framework and time frame of the Strategy

Pursuant to the definitions of Government Decree 38/2012 (12 March) on strategic management by the government, the NLS is being developed in compliance with the criteria of policy strategies[2]. However its fundamental purpose and mission resulting from the Landscape Convention is to develop a horizontal vision which goes beyond the given policy areas and to devise a medium-term strategy to achieve its vision. The primary responsibility for implementation lies with the FM. Its draft must be presented for public comment and a subsequent evaluation must be made within one year of its implementation. The structure of the strategy document (analysis and evaluation of the situation; measurable objectives, required actions and their preconditions; follow-up and evaluation) follows the requirements of the applicable government decree to the extent allowed by the given topic. The strategy document must be approved by the Government.

[2] Within the meaning of Government Decree 38/2012 (12 March), a policy strategy is a medium-term strategic document for achieving the vision of a given policy area.

1.3 The mission of the Strategy

Taking into account the extensive list of tasks, specified by the Council of Europe and presented in the introduction, and the principles laid down in the Landscape Convention, the mission of the first National Landscape Strategy can be summarized as follows:

- Development of a complex holistic approach to the land use and having it accepted by those involved in land use.
- The landscape should be seen as a vital element of nature, including man and as the depositary of environmental quality. It must be made an underlying approach element of sectoral policy areas and functions. Not only the areas and functions, determined based on the aspects of protecting outstanding values, as specified in the different policy systems, must be protected and conserved.
- The condition of the landscape and the triggering effects must be handled together through revealing causal consequences while pointing out the necessity for taking responsibility for utilizing landscapes.

This strategy reviews how Hungary satisfies international expectations, and presents the most dominant landscape formation processes, the effect of these processes and the condition of the Hungarian landscape. The Strategy builds primarily on opportunities, by keeping in mind the following three horizontal principles:

- General protection of natural resources and cultural heritage;
- Wise and rational use of areas;
- The mitigation of the impacts of climate change and adaptation to it.

NLS sets **responsible land use based on landscape configuration and assets** as a comprehensive objective by virtue of its vision.

The Strategy has the following three key goals as parts of the overall objective above:

I. Laying the foundations for land use based on landscape configuration and assets;
II. Liveable landscape – liveable settlement – wise land use;
III. Enhancing landscape identity.

2 Main interfaces of the Strategy within the system of national strategies

The landscape is represented in the strategy documents developed and approved in the past 10 years, although it is represented only indirectly and not in the ternary system of protection-management-planning of the Landscape Convention. For the review of the interfaces of the landscape strategy, we gave priority to those that determine territorial development, sustainability, natural and environmental condition and the development directions of utilizations relying on natural configuration. They are:

- National Development 2030 – National Development and Territorial Development Concept,
- National Sustainable Development Framework Strategy 2012-2014,
- National Strategy for the Conservation of Biodiversity in 2015-2020,
- Second Climate Change Strategy of Hungary for 2014-2025 with an outlook to 2050 (approval is underway),
- 4th National Environmental Programme 2015-2020,
- National Nature Conservation Master Plan,
- National Rural Development Strategy 2012-2020,
- National Water Strategy (Jenő Kvassay Plan, not approved yet),
- National Forestry Strategy 2016-2030,
- Action plan for Energy Mineral Utilization and Stockpile Management (approval is underway),
- Gear shifting in higher education - a medium term policy strategy, 2016.

In relation to Hungarian landscapes, the **National Development 2030 – National Development and Territorial Development Concept** (NDTC) identified the unsustainable utilization of natural resources, the rapid transformation and degradation of natural environment and global warming as dominant processes. The bottom line of the concept is to preserve and develop national resources in a balanced and harmonious way. Government should enforce the requirements of sustainability in order to increase public awareness to the sustainable management of our natural resources and the protection of landscapes and to help it become part of the social values. Among the specific objectives are the establishment of multi-centre urban spatial structures, the increasing of the capacity of rural regions to support their population, and the improvement of regions with outstanding landscape value. It identified the following interventions to achieve the specific objective of *Viable rural territories*: increasing the role of natural, environmental and landscape protection, preserving biodiversity; safeguarding and value-based development of rural heritage as well as the social, landscape-related, farming and architectural values of Hungary's rural territories; strengthening the protection of traditions and local identities.

The **National Sustainable Development Framework Strategy** (NSDFS) noted the overexploitation of natural resources, the decrease in their quantity and the degradation of their quality. To improve the status, it asks local governments to the foster environmental awareness, to use renewable energy sources, and to implement restricting requirements for resources in a critical state. The proportion of built-up areas compared to the area of the country, the proportion of ecological farming areas in the country, urban environmental quality and the natural capital index are described as indicators. The vegetation-based natural

capital index of Hungary is 9.9% which shows that the country has already lost 90% of its natural ecosystem services or uses it for other purposes.

The National Strategy for the Conservation of Biodiversity in 2015-2020, i.e. the **2nd National Biodiversity Strategy** (NBS 2), is the document highlighting the ecosystem services and the green infrastructure network. Its objective is to halt the loss of biological diversity and the decline of ecosystem services. In addition to biodiversity it is necessary to preserve landscape diversity and to maintain the land use which creates the mosaic-like pattern of the landscape. To do this we need more knowledge of how the different uses changed the landscape. There is a need for monitoring and for the analyses of sensitivity and load capacity and for methodologies. This document also mentions the need to establish a green infrastructure network. Relying on the national ecological network, not only already protected areas, but unbuilt, free areas must also be incorporated into a single system. The strategy recommends reducing invasive non-indigenous species as well as reducing the utilisation of arable lands and forests for other purposes.

The **Second Climate Change Strategy of Hungary** (CCS-2) emphasizes the vulnerability of sectors, ecosystems and habitats in terms of climate change. Outlining the problems and expected effects, it presents short-, medium- and long-term action programmes. These programmes require the development of a single green infrastructure network of semi-natural ecosystems (core areas, buffer zones, corridors, stepping stones) monitoring of areas Maintaining uncultivated lands in urban and agricultural areas (balks, hedges, lines of trees) and improving them to achieve a favourable natural state, the maintenance or the resumption of traditional soil management and the revitalisation of small watercourses and their banks are included as medium term action programmes. It classifies the expected ecological impacts of climate change into a system of direct and indirect effects (temperature, precipitation, changes in wind). It is indirectly linked to climate-aware urban planning set as a long-term objective under the topics of built environment, urban development, urban infrastructure. Its goal is to establish compact towns with green areas.

The **4th National Environmental Programme** (NEP) and the National Nature Conservation Master Plan (NNCMP) devoted individual chapters to landscape protection. Each of the strategies refers to the necessity of developing a classification relying on landscape type or landscape character, the protection of landscape and landscape potential, the preservation of biodiversity and the need for further improving the National Ecological Network (NEN) and the need for the effective management of arable lands and biologically active surfaces, and biologically active surfaces. In addition to new landscape protection legislation, regional and urban planning were specified as means for achieving the objectives. It responds challenges posed by climate change, the recovery of brownfield areas instead of greenfield investments, the elaboration of a balance based on the categories of land use, as well as the monitoring of the implementation of the local construction regulations as new tasks and the directions of action.

The objectives of rural policy are to ensure sustainable development of rural regions. One element is the protection and sustainable use of the landscape, the natural assets and resources, to protect the ecosystem services and improve environmental quality. To this end, the **National Rural Development Strategy** (NRDS) set the goals of protecting landscape diversity, biodiversity and the natural resources (soil, water resources, water reserves) being crucial for farming , and of maintaining their quantity and quality. Instead of provoking conflicts resulting from the difference in environmental, social and economic interests, the

goal is to promote the cooperation between the landscape and man living in it and taking care of it. Preserving and improving the irreplaceable biological and ecological bases and the environmental systems offering good environmental quality are also the pre-conditions for providing good quality food and other agricultural products. The development of regional landscape management plans by involving those affected by land use and the elaboration of a landscape character protection programme (harmonizing general landscape protection with the agricultural strategy by assessing how the landscape protection and nature conservation aspects can be incorporated) are among the strategic directions and actions. The tasks also recommend a support scheme for farming activities that fit the landscape configuration by specifying the desirable forms of farming for each region/smaller region (e.g. sub-programme for farming on the flood bed, using landraces in cultivation). Funds for this could be granted from subsidies under Pillar 2 of the Agricultural Policy. I It would support the establishment and development of model farms and landscape centres/institutes that help in discovering landscape management traditions, keeping landraces or indigenous species in production, and present farming traditions typical of a landscape, take the role of coordinating a region and teach sustainable rural development. The realization of all these, however, is still to be waited for.

The **Jenő Kvassay Plan** (JKP) – the **National Water Strategy** – defines actions based on the relationship between Hungarian society and water in order to avoid a water crisis; we should save water for future generations, use its benefits efficiently and it should be properly protected against any and threats of future damage Due to the public nature of water and our vulnerability, the state has traditionally taken higher responsibilities and assumes more tasks in Hungary. It has authority in all water-related activities on the entire country. One of its important missions is to adjust social demands to the available opportunities. It identifies goals and tools for the management and use of waters, encourages irrigated farming, and works to prevent and mitigate the adverse effects of droughts. It contains proposals on the modification of the work of national and municipal governments, the improvement of financing conditions and the targeted restructuring of the organisation. The objectives of the plan are urban water management, water damage prevention, regional water management, irrigation development and drought management target mainly the retention of water, runoff control, the mitigation of security risks and the improvement of qualify of life. Promoting irrigated farming is highly emphasized for the predictability and security of agricultural production. The harmonious development of water management, the economy, society and the rural areas is important. The strategy concludes that there is a need for a paradigm change in the relationship between agriculture and water management.

As included in the **Water Framework Directive** only solutions that take into account the single water cycle are sustainable. Sustainability which considers all natural configurations must form an integral and indispensable part of agricultural water management actions. The ecological aspects in water management are included as a separate topic in the strategy.

In accordance with the strategic objectives of flood risk management, it must promote the coordinated management and preservation of activities related to water, lands, natural resources and natural assets. Complex solutions should be sought and the focus of tasks should be shifted towards prevention. In addition, the safety requirements applicable to flood protection must be reformulated. The Flood Risk Management Plan specifies the degree of risk acceptable to the society.

By virtue of Government Decree 38/2012 (12 March) on strategic management by the government, the National Forestry Strategy 2016-2030 (Forestry Strategy) is a long-term strategic plan document that shall be promulgated in a government decision. The Forestry Strategy seeks solutions to questions of forest protection and forest management. It presents the short- and medium-term goals of the forestry sector and it also suggests possible solutions to specific problems while still fulfilling our international commitments. To achieve sustainability, it aims to ensure the environmental, economic and social services of forests in the long run through multi-purpose, sustainable forest management. It also encourages the harmonization of social interests of sustainable farming and the interests of owners or farmers. One of its main goals is to increase the size of forest lands in Hungary to 27% forest cover through afforestation. Its objective serving the protection of landscape is the safeguarding of natural or semi-natural forests composed of indigenous species and to increase their area by taking into account their site conditions.

A general objective of the Action Plan for Energy Mineral Utilization and Stockpile Management is to improve the economic and social perception of the mining sector and the energy sectors relying on it with a view to future technical, environmental and economic tendencies. The Action Plan disputes the widespread opinion that Hungary is poor in energy sources. Using more of our geothermal potential, exploiting coal and lignite (with a suitable exploitation technology in place), and our non-conventional hydrocarbon reserves will significantly increase Hungary's security of supply and substantially decrease our import dependency in the long run. Larger scale exploitation and utilization of Hungarian energy sources is only possible if technologies or new developments satisfying the stringent environmental and climate protection requirements are used and nature conservation and landscape protection are taken into account. In addition to the raw materials for construction representing the largest portion of Hungarian mining production, ores and other raw materials in mineral extraction also have a significant potential in our national economy and industrial development. Reasonable and sustainable management of state-owned minerals is in the interest of all, the state, the economy and society.

The document entitled "Gear shifting in higher education" sets the future directions of higher education until 2030. The strategy emphasises the importance of the third mission of higher education: increasing the activity of higher education institutions in responding to challenges and in spreading social innovation.

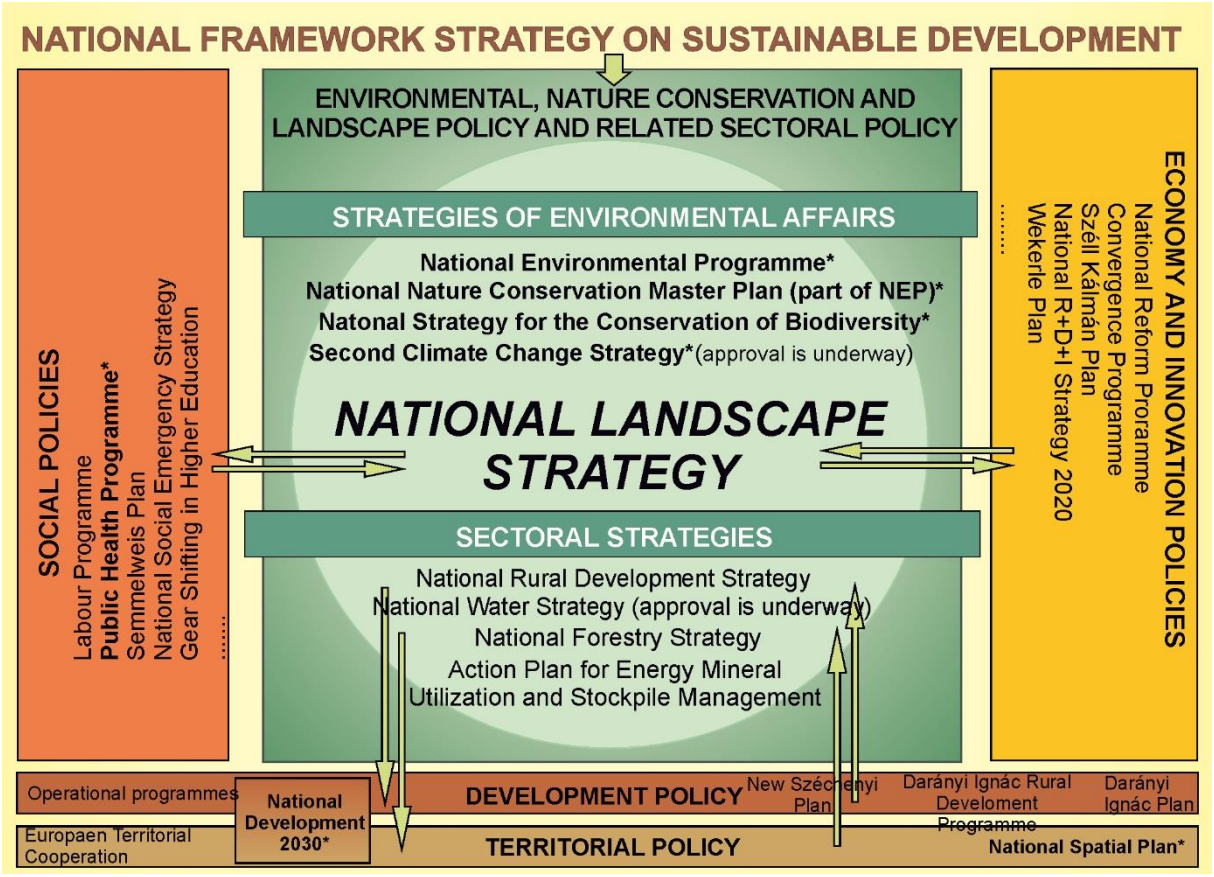
Summary of the strategies

In summary on a strategic level, the protection of natural assets, biodiversity, raw minerals and the preservation of environmental quality are the dominant elements in the chapters: *Principles and Strategy*. A landscape level approach is represented only indirectly in certain sub-topics. The overall conclusion is that consistency is greater on the level of principles than during their implementation. Many land use conflicts can be foreseen if the programmes and objectives of development strategies are known. When setting the goals and determining the areas of action, we took into account the landscape elements of valid strategies and the operational programmes for 2014-2020.

With full knowledge of the strategies reviewed, the **NLS emphasizes the change in land use and land cover** on both protected and unprotected areas. Figure 1 shows the place and role of NLS within the Hungarian planning scheme.

It is important that according to the order of strategic management by the government, the new strategies and the existing strategies that are reviewed must integrate the requirement for *responsible land use based on landscape configuration and assets* and must incorporate the actions specified for the following goals (in Chapter 6) into the sectoral policies.

- Laying the foundations for land use based on landscape configuration and assets;
- Liveable landscape – liveable settlement – wise land use;
- Enhancing landscape identity.



(*document approved by the General Assembly)

Figure 1 The place and role of the National Landscape Strategy within the Hungarian planning scheme

3 International outlook

The following international conventions, strategies, international legal documents and programmes have been taken into account for the development of the Strategy:

- European Landscape Convention of the Council of Europe,
- World Heritage Convention,
- Council of Europe Framework Convention on the Value of Cultural Heritage for Society accepted in Faro,
- Ramsar Convention,
- National Landscape Strategy for Ireland,
- National Landscape Strategy of Switzerland,
- EU Biodiversity Strategy 2020,
- Pan-European Biological and Landscape Diversity Strategy,
- EU Strategy for the Danube Region,
- EU Birds Directive,
- EU Habitats Directive,
- Regulation (EU) No. 1143/2014 of the European Parliament and of the Council on the prevention and management of the introduction and spread of invasive alien species,
- Directive 2000/60/EC - EU Water Framework Directive
- Directive 2007/60/EC - EU Floods Directive,
- General Union Environment Action Programme to 2020 ‘Living well, within the limits of our planet’,
- UNESCO’s Man and the Biosphere Programme,
- The raw materials initiative of the European Commission (2008),
- Strategic Implementation Plan of the European Innovation Partnership (2013).

Europe will have to face many challenges in the years, decades to come. Such challenges are:

- compliance with the requirements on sustainability;
- dealing with the expected energy crisis;
- the climate changed;
- halting the loss in biological and landscape diversity;
- demographic change.

4 Comprehensive situation analysis

4.1 Hungarian landscape in 19th and 20th centuries

In the past two centuries, Hungary has seen significant economic, social and geopolitical changes that also significantly transformed the land use as well as the relations of urban to rural areas. During this period, human interventions caused significant changes in natural potentials, in particular in the water system.

In the first half of the 19th century, during the period between the first and the second military surveys, there were only small scales or negligible changes in land cover[3]. At the end of the 18th century, adaptive land use did not significantly modify the water conditions. However, by the second half of the 18th century, the landscape transformation accelerated by land drainage and the growth of capitalism. From the second half of the 19th century, the beginning and boosting of industrial production affected landscape formation through mining and industrial activities on large areas. This caused expansion the area of settlements (Figures 2-5). On large farms, new agricultural methods were implemented that laid the foundations for intensive production of plants and animals. Figure 6 clearly shows that there was a decrease in the size of grasslands and moorlands while the size of settlements, built areas and forests increased. A significant decrease in the size of areas exposed to water reflects the consequences of land drainage and river channelling efforts of the 19th century.

Having summarized the changes in land cover on national level, we found that following an initial decrease in forested areas, forests reach or exceed the same proportion as 200 years ago. In all regions, settlements or built up areas multiplied. The proportion of grasslands and arable lands shifted towards arable lands everywhere. The main tendencies are the drastic decrease in the proportion of grasslands, the decrease of moorlands to the half of their former size, and a fourfold increase in the area of settlements and a 20% increase in agricultural lands. Looking at the larger regions, on the Great Hungarian Plain, and the Little Hungarian Plain arable lands are dominant, while there is a significant decrease in wetlands and grasslands and a major increase in the area of settlements. The proportion of grasslands significantly decreased in the hills and middle ranges due to the increase in forests.

More intensive land use leads to the permanent and continual impoverishment of the vegetation heritage. This process is clearly shown in Figure 7 that summarizes the changes in semi-natural habitats (semi-natural grasslands, forests and wetlands) of Hungary from the 18th century until today and represents the long-term trends of habitat destructions separately for 19 counties. The trend graphs were drawn up from the evaluation of 5,000 random sampling points over seven past dates[4].

[3] Changes in land cover throughout the country in the period between beginning to the 19th century and 2006 were reviewed by comparing the military maps and 2006 Corine land cover data and by examination with the help of maps (Konkoly-Gyuró et al 2016).

[4] Past vegetation was examined by using maps, as main sources, that give a clear representation of the different eras of landscape formations and cover large areas, and remote sensing sources such as the first and second Military Surveys as well as those made in the 1940s (HM HIM, Arcanum Kft.), Ortofotó-2000 (FÖMI), Corona, Landsat TM and recent satellite images (USGS, Interspect Kft, ArcGIS.ESRI/Imagery) (in details: www.novenyzetiterkep.hu/node/896). The research was supported by the project "Sustainable Conservation on Hungarian Natura 2000 Sites" within the framework of the Swiss Contribution Program (SH/4/8).

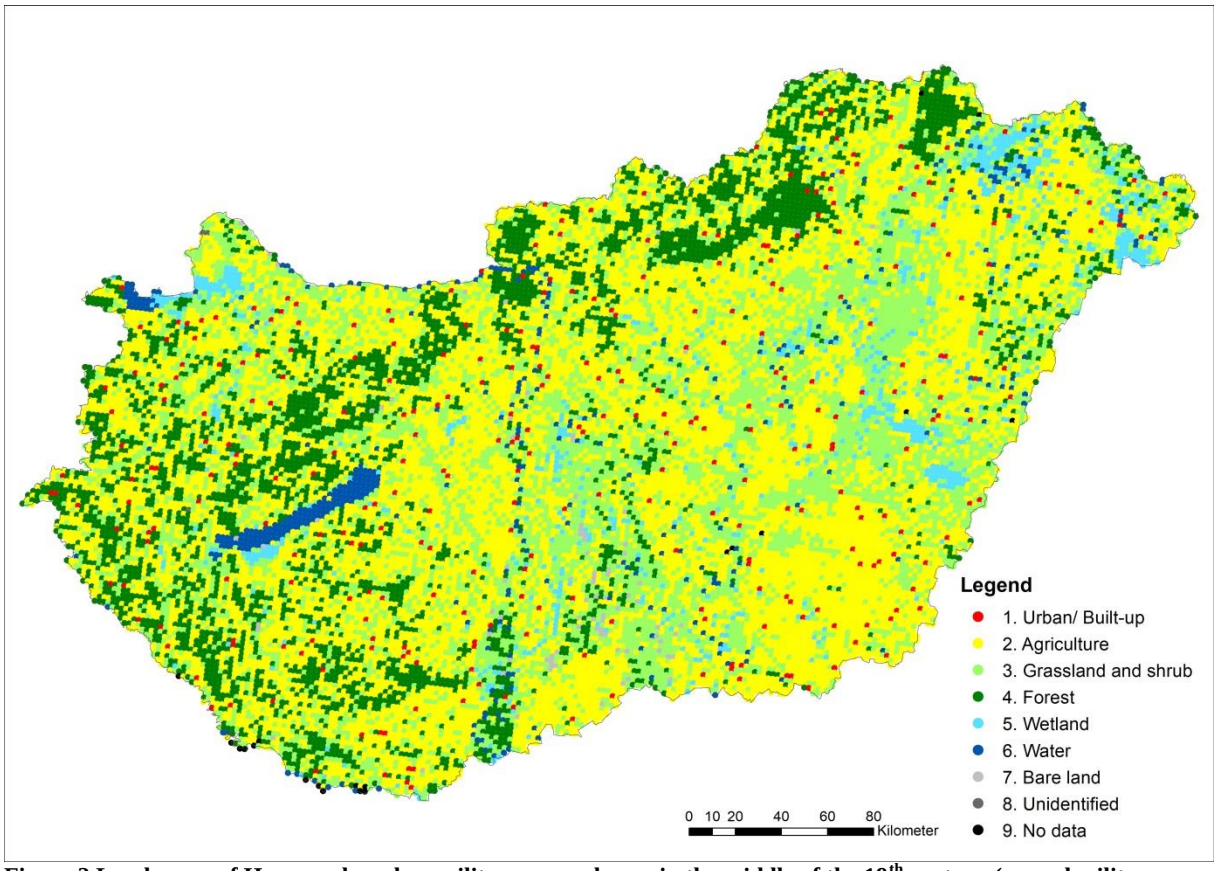


Figure 2 Land cover of Hungary based on military maps drawn in the middle of the 19th century (second military survey)

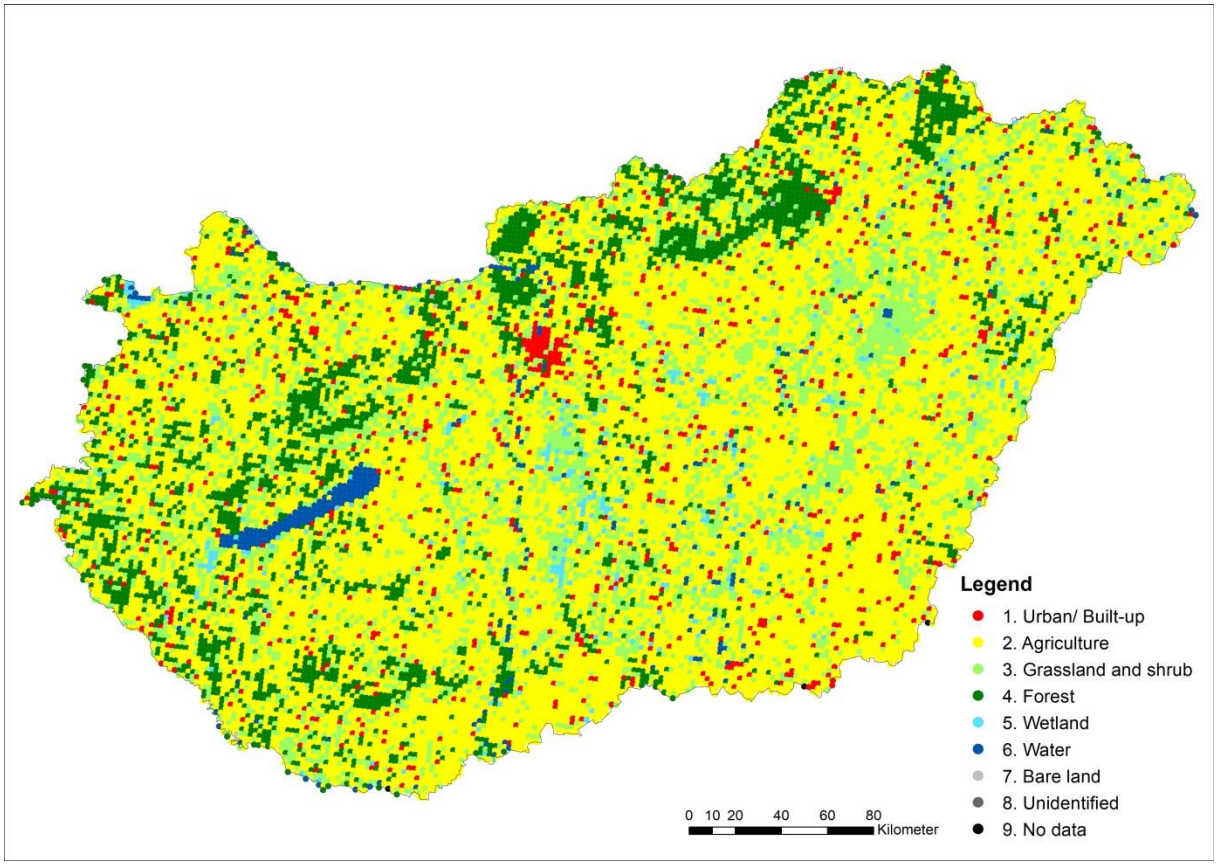


Figure 3 Land cover of Hungary based on military maps drawn between 1940 and 1944

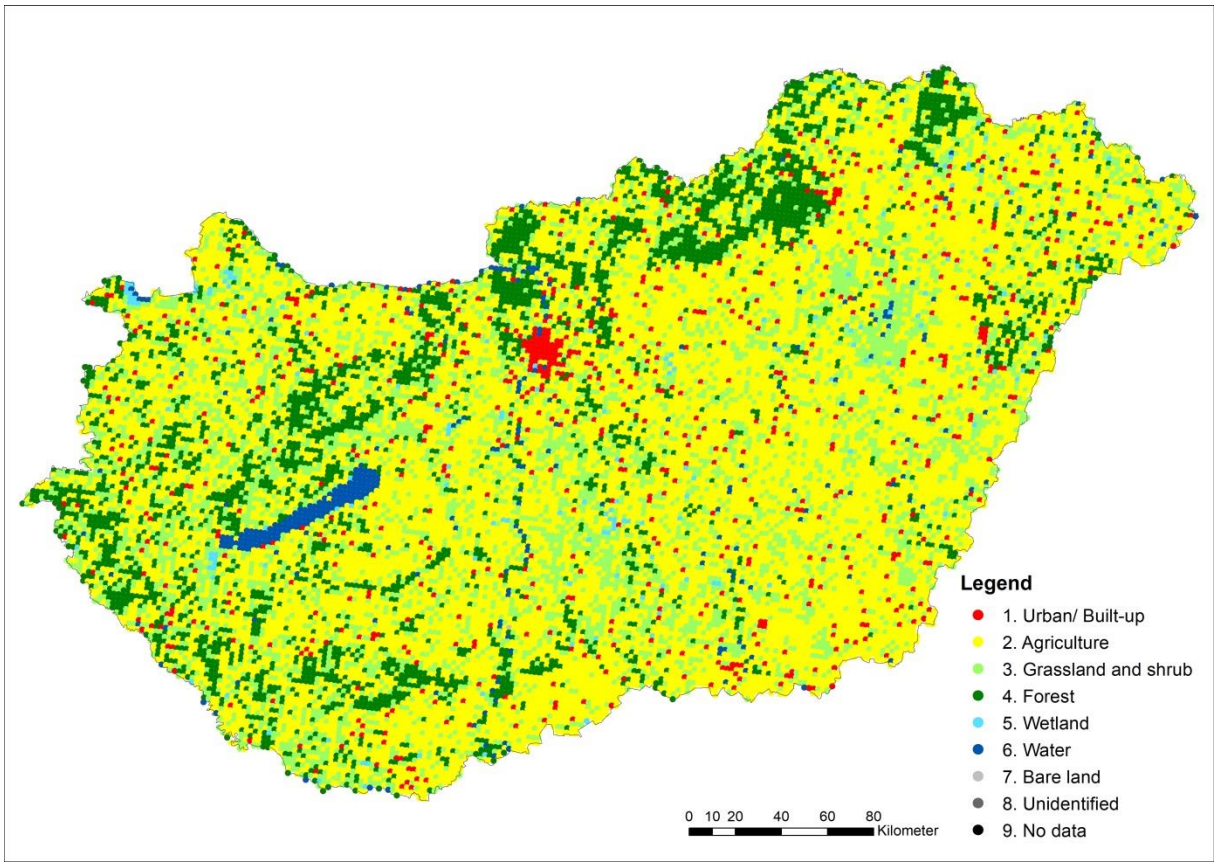


Figure 4 Land cover of Hungary based on military maps drawn between 1953 and 1959

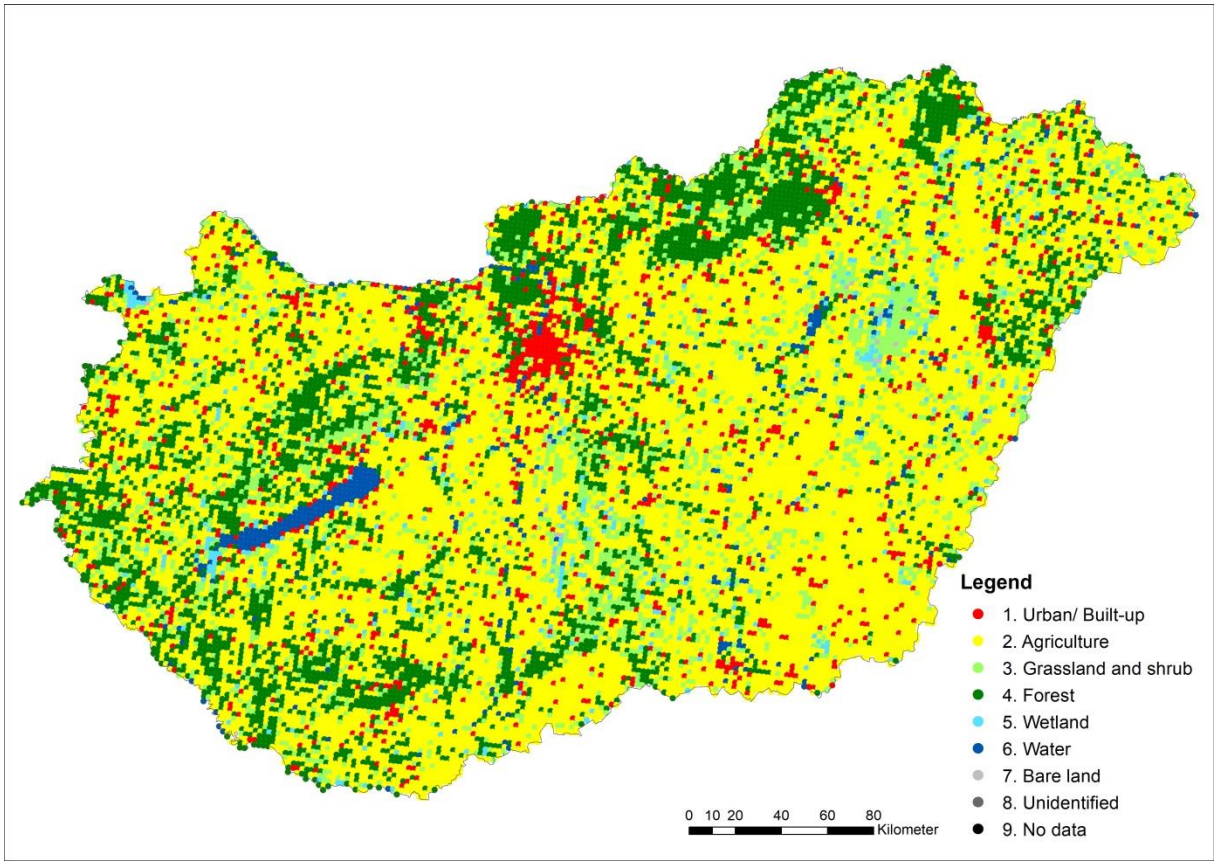


Figure 5 Land cover of Hungary based on land cover database CORINE 1:50 000 representing the situation of 1998-99

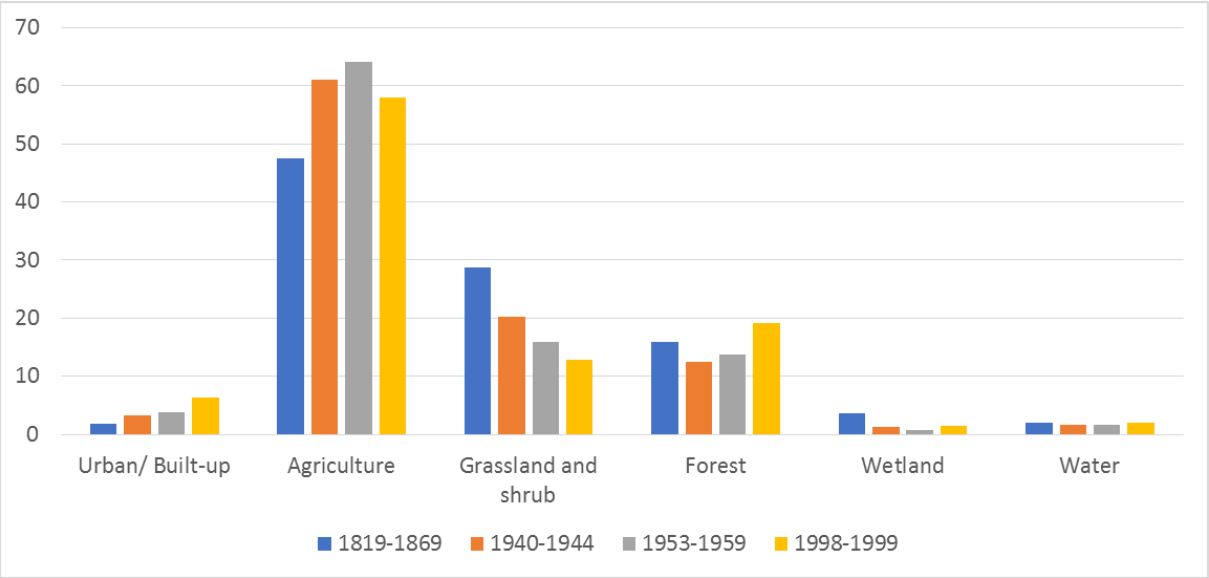


Figure 6 National review of the changes in land cover from the beginning of the 19th century until 2006. Source: Konkoly-Gyuró et al.

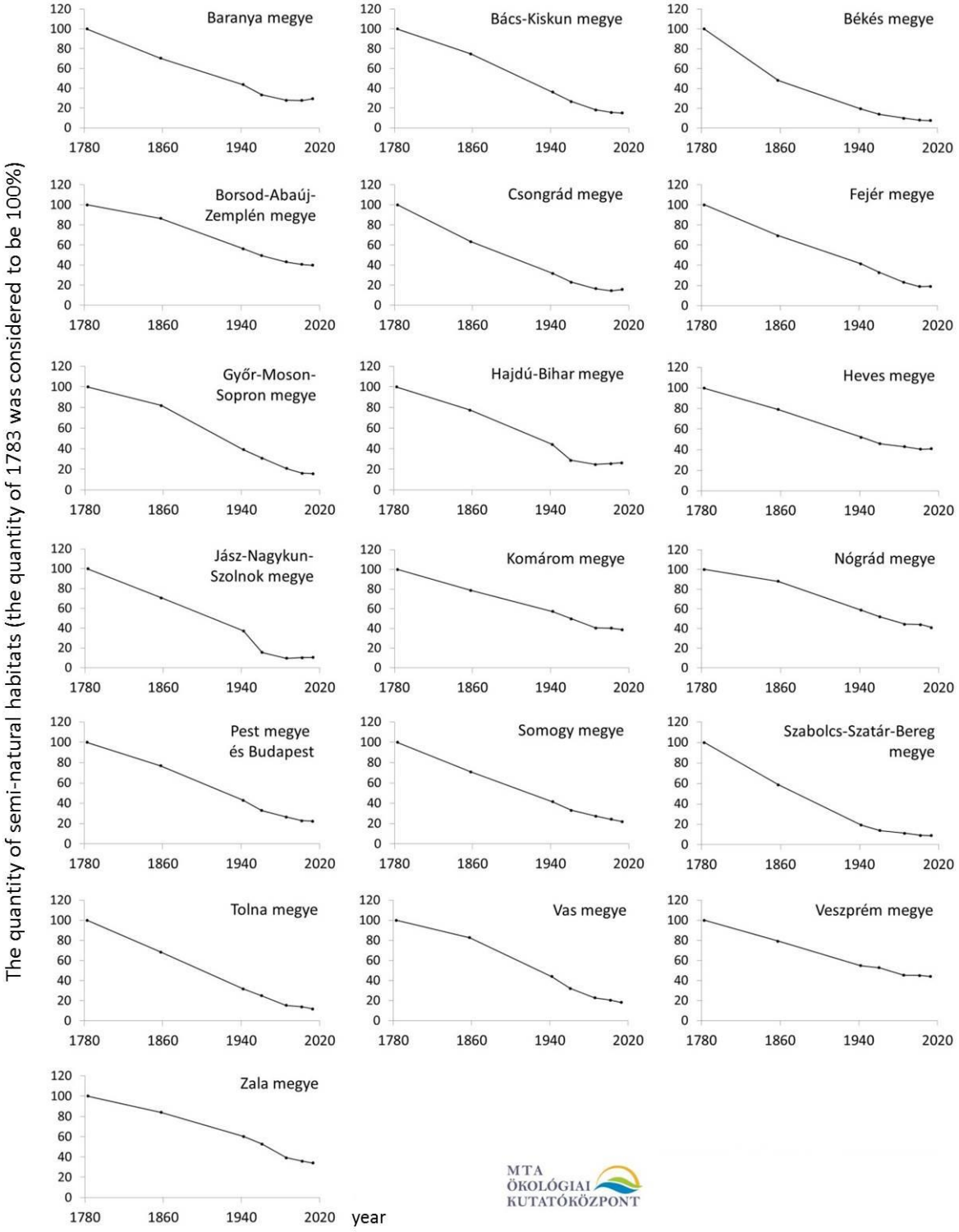


Figure 7 Decrease in semi-natural habitats (semi-natural grasslands, forests and wetlands) of Hungary from the 18th century up to now in each county. The quantity of semi-natural habitats existing at the end of the 18th century was considered to be 100%.

4.2 The evolution of the Hungarian landscape policy

The evolution of landscape protection

Landscape protection was first stipulated in the Forest Act of 1935, then in Act II of 1976 on the protection of the human environment and in Law Decree No. IV of 1982 on nature conservation. These acts allowed for the protection of certainlarger landscape areas of high importance and considered to be worthy of protection through nature conservation by declaring them protected which ensured the preservation of the landscape structure and traditional land use. These acts created nature reserves, landscape protected areas and national parks.

In 1992 a proposal was made in the Ministry of Environmental Protection and Regional Development for the regulation of the landscape protection of areas not enjoying specific nature conservation. Under the headline "general landscape protection," the first technical document formulated proposals for the regulation of areas not included among protected natural areas and outlined the administrative structure for landscape protection to be set up on the model of the nature conservation directorates of the time. The professional initiative received limited political support. Because of the need for downsizing public administration, neither the establishment of an independent organisational structure, nor a separate legal regulation on landscape was supported. Instead its regulation was proposed to be integrated into the act on the protection of nature drafted at the time (currently in force) under the title "landscape protection and nature conservation act." The draft act on "landscape protection and nature conservation" was amended several times in parliament. " Landscape protection" was deleted from the title and was kept only as the title of a chapter. Act LIII of 1996 on nature conservation was the first to grant protection for landscape of unprotected areas.

In the previous year, Act LIII of 1995 on the general rules of environmental protection was passed. Although it did not specify landscape as a complex system, its scope covers all landscapes since it applies to the living organisms (and their communities), and the inanimate components of the environment, as well as the natural and man-made environment. It declares that every environmental component shall be protected in itself and in unity with other environmental components and by taking into consideration its interrelationships.

The evolution of landscape planning

The Balaton Regional Plan in 1958 was the first plan going beyond the boundaries of settlements, typically tailored to a functional region and specifying the roles of settlements and the utilization of areas. It was considered to be the first regional plan in the world. The primary objective of the plan was to contribute to the development of tourism. In addition to the regional plan, each settlement or local community drew up its own general development plans, building regulations and, annexed to the development plans, the investment proposals of the local community. The next step in landscape planning was the landscape management plan for the Tihany Peninsula classified as a landscape protected area (1952), drafted by the Városépítési Tudományos Intézet (research institute - VÁTI) in 1971. Starting in the 1970s, river basin management studies were made by VIZITERV for hilly areas and mountains. These studies contained condition assessments of agriculture, forestry, water and soil erosion, and contained parts of development plans with individual chapters on nature conservation and later with parts of environmental and landscape protection plans.

Notice 9007/1983 of the Ministry of Building and Urban Development (ÉVM) about the requirements on the contents of land use plans already contained references to landscape management to the extent that it regulated landscape planning activities within the framework of drawing up development plans and linked landscape planning to master development plans. This established regional landscape development plans and a special type of such plans the "regional and landscape development plans" applied to national parks and landscape protected areas. In these plans landscape protection and nature conservation were represented as a basis for classification. The regional and landscape development plans[5] can be regarded as a prefiguration of today's land use plans since there are many similarities in their regulatory content. Regional and landscape development plans did not have a legal effect (even if they were approved by the general county councils) because there was no legislative provision that would have clarified the legal status of landscape development plans, their place in the hierarchy of plans or if they could be enforced. The adoption of the act on regional development and land use planning put an end to this situation.

From the beginning of the 1980s, the tasks associated with creating green areas, landscape development and landscape planning of settlements were undertaken as a specialized part of drawing up development plans. In the detailed development plans, the tasks associated with green areas, while in the master development plans the tasks associated with landscape development were required to be carried out by special divisions. In both types of plans, landscape development and green areas were included as compulsory and supportive parts of work not requiring approval. The Ministry of Building and Urban Development (ÉVM) supported the compliance with the requirements on the form and content of elaborating such plans with planning aids tailored to the different special divisions.

The development of landscape management

The rules applicable to the elaboration, and the content of nature conservation management plans of nature reserves of national importance were laid down in a ministerial decree in 2001 and the rules applicable to the compilation of the management plan documentation are set out in a ministerial order (after the former decree level) in 2012.

The obligation for drawing up and proclaiming of the World Heritage management plans for World Heritage sites are stipulated by the act on World Heritage that entered into force in 2012.

4.3 Drivers determining the condition of Hungarian landscapes

The processes currently affecting the condition of Hungarian landscapes are summarized in the following points:

- **The extremities of the changes in population size in the different regions of the country**

[5] Regional and landscape development plan of Káli-medence protected landscape – 1987, Landscape development plan of the Bükk National Park –1993, Regional and landscape development plan of Zemplén protected landscape – 1996, Regional landscape development plan of Duna-Dráva National Park and its environs – 1996, Land use plan of Kiskunság National Park – 1998, Land use plan of Fertő-Hanság National Park -1998, Land use plan of Duna-Ipoly National Park – 1999, Land use plan of the Hortobágy National Park and its environs– 2002

The different regions of the country show significant differences in the extreme increases and decreases in population. In parallel with the concentration of the population in urbanizing regions, the residential and production functions become more and more distinct. As a result, the demands for transport and delivery increased inducing continuous infrastructure developments. The increase of built up areas and the construction of linear infrastructure fragment the landscape, change its character and its appearance and creates an ecological barrier between habitats. The new infrastructure developments and the growing mobilization generate a demand for minerals and energy sources. To satisfy social and economic demands, the methods used by mining and water management have gone through significant changes and are permanently changing.

An opposite process took place in areas with small villages and localities which began to depopulate. The remaining population is typically aged. Thus they cannot cultivate surrounding lands even for their own sustenance.

- **Difference between the economic demand and regeneration capacity of the natural resources**

The intensity of the different ways of utilization relying on natural configuration, such as agriculture, forestry, industrial production, tourism, raw material extraction and energy management, is always determined by the actual economic needs and by the regeneration capacity and load bearing capacity of the natural resources (their configurations, landscape potentials). For the population's comfort, we use our natural resources inefficiently and in a way that does not take into consideration the load bearing capacity of landscapes. What is more, interests for utilizing landscapes contradictory to their natural configuration have increased.
Due to technological development and area developments, (e.g. drainage of areas exposed to water), the utilization of areas has become partially independent from natural configurations, but it implies increasing risks and, consequently, social and financial expenditures. Instead of reasonable land use, increasingly areas are used improperly, without taking into account their environmental configurations and unfavourable land use schemes are sustained. Lacking correct incentives, there is a decrease in land users' interest in the reasonable utilization of soil taking into account local characteristics, based on the landscape potential and, if needed, changing land use.

- **The weakening of landscape identity**

As lands were not owned for generations, no bonds with a given landscape could develop in Hungary. The transformation, loss of landscape identity after the regime change is partly the result of the process described above. Many people moved to urban areas thus losing their bonds with their former landscape. The process of separation may be accelerated and further strengthened by the quick expansion of internet coverage and the difference between traditional values and those of the growing cyber generation. Globalization, as well as selling and consuming products produced in other countries instead of the locally produced ones may also weaken bonds with the landscape and to losing identity. Landraces known by former generations are about to disappear from the markets but the existence of local producers' markets is also at risk. In an artificially supported economic environment, the knowledge of and skills in traditional landscape management lose their significance and gradually disappear.

- **Definitive role of protective actions**

When adaptive land use declines, legal protection has a definitive role in safeguarding cultural and natural assets because of the intensive agricultural production and the growing need for

building in or occupying areas. The most frequent social factor causing changes in landscape character, the dominant land use is ideally in harmony with the natural configuration of a given area. There are coincidences when simultaneous land uses threaten each other or the natural configurations. In such cases, there is a need for protective measures which are typically represented by the classification of the area into one of the protection categories and the application of the requirements ensuring protection. In such cases land use and each individual associated activity must be harmonized or, if needed, restricted in order to achieve an overriding objective jointly agreed (and consensus based).

4.3.1 Quantitative and qualitative change in needs: expansion of the settlements, changes in settlement structure and land use

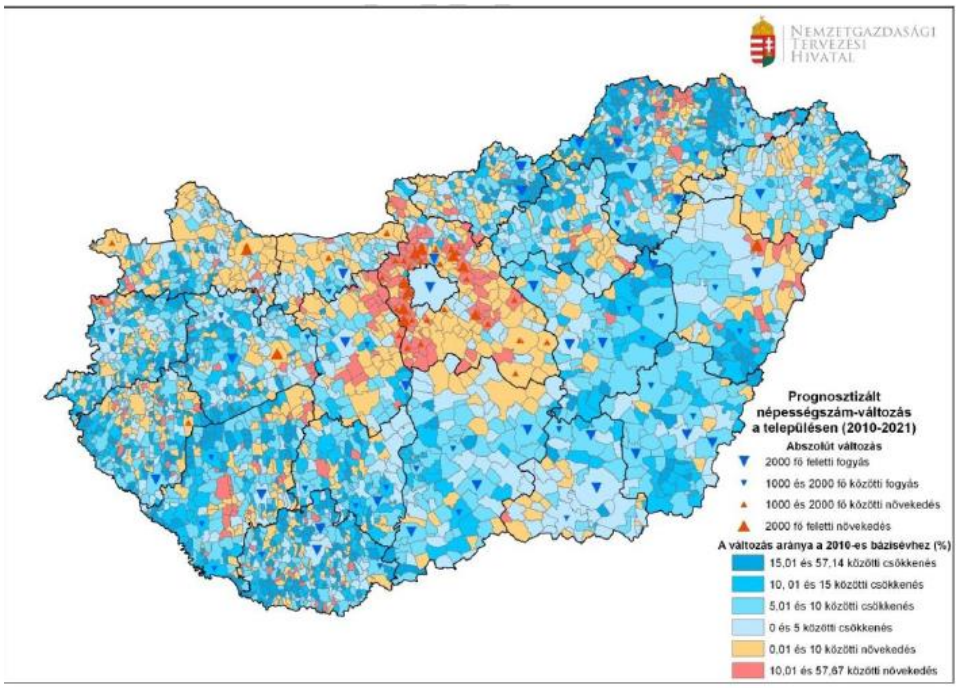
4.3.1.1 The extremities of the changes in population size in the different regions of the country

In historical times, a dominant factor for the multiplication of settlements and the expansion of the individual settlements was the increase in population. The first wave of settlement expansion commenced after the Ottoman rule when the city walls and fences lost their protective roles. Afterwards new types of built areas that can be classified into new types of settlements (estate centres, demesne lands, servants' settlements, homesteads) made the network of settlements denser when extensive husbandry was overshadowed by cropland management. Due the transformation of landscapes by mining or industrial activities, mining towns and industrial towns developed, flourished or decayed.

The population of Hungary reached its peak around 1980. Ever since populations has been decreasing, which is primarily caused by the extremely low number of births compared to the European average and our higher mortality rate. On 1 January, 2016, 9,830 million people lived in Hungary, less (with the population of a city) than in 2006 (Hungarian Central Statistical Office - KSH). In contract, the proportion of built areas withdrawn from cultivation has nearly doubled. In the past ten years, population decreased in almost all regions of the country, except for Budapest and the regions of Pest and Győr-Moson-Sopron County that are becoming conurbations.

The territorial rearrangement of the population resulted in the depopulation of rural areas. Among the counties, Békés County saw the biggest drop in population (10.1%). The population decrease of Nógrád, Borsod-Abaúj-Zemplén, Tolna, Jász-Nagykun-Szolnok and Baranya counties was also higher than 7.5% (KSH). I Internal migration motivated by a changed lifestyle and better livelihood prospects also shows that the population flows into more developed regions and settles in larger cities or in their conurbations. The capital city and its conurbation are an immigration target for the whole country; people are coming not only from peripheral regions but from larger, economically more sound towns as well (NDTC).

Since 1990, the direction of internal migration was from Budapest and it reversed in 2007. The migration balance is positive in Pest County, mainly positive in Fejér and Győr-Moson-Sopron counties, but the capacity of the North Hungarian Mountains and the Southern part of the Great Hungarian Plains to retain population is low. Migration affects primarily recent graduates and youth. Therefore population is typically ageing in areas where outward migration is high.



Demográfiai prognózis (2010-2021)
(Forrás: Prodemo Bt.)

Figure 8 Demographic forecast of NDTC shows great territorial differences

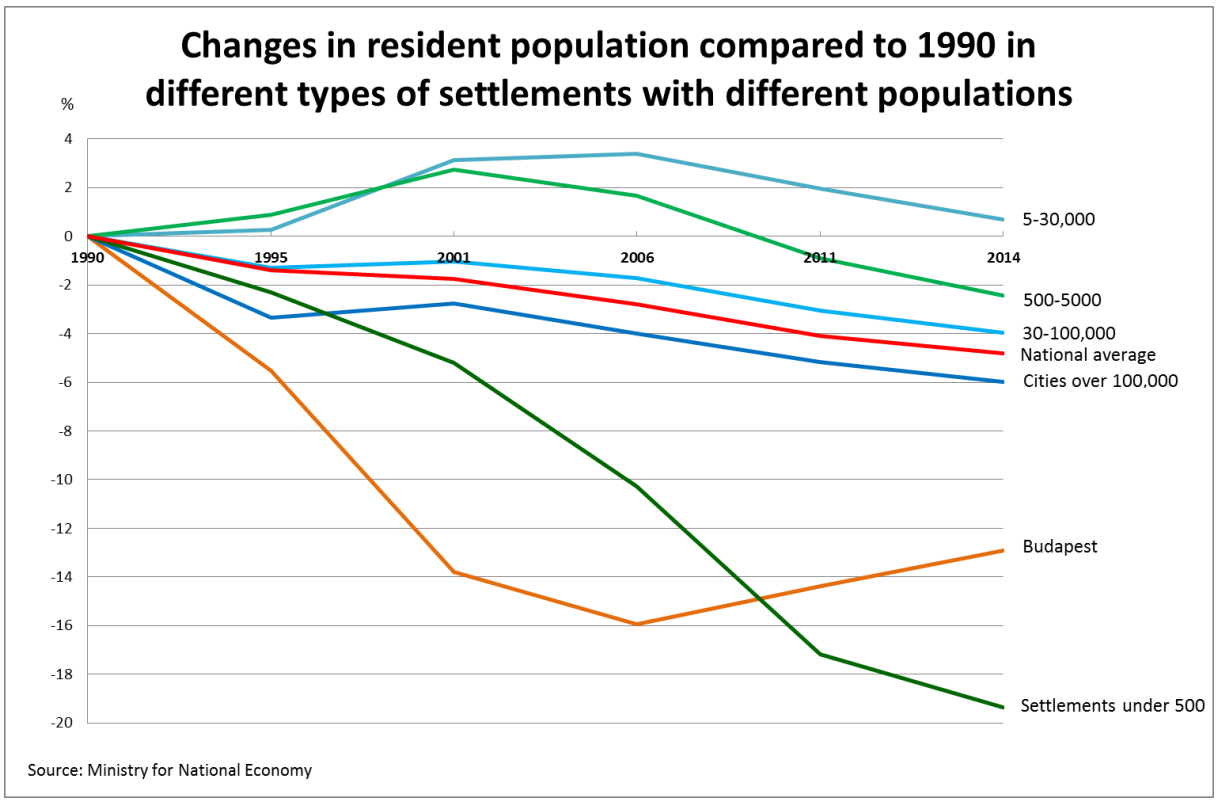


Figure 9 Changes in resident population compared to 1990 in different types of settlements with different populations. Source: Ministry for National Economy

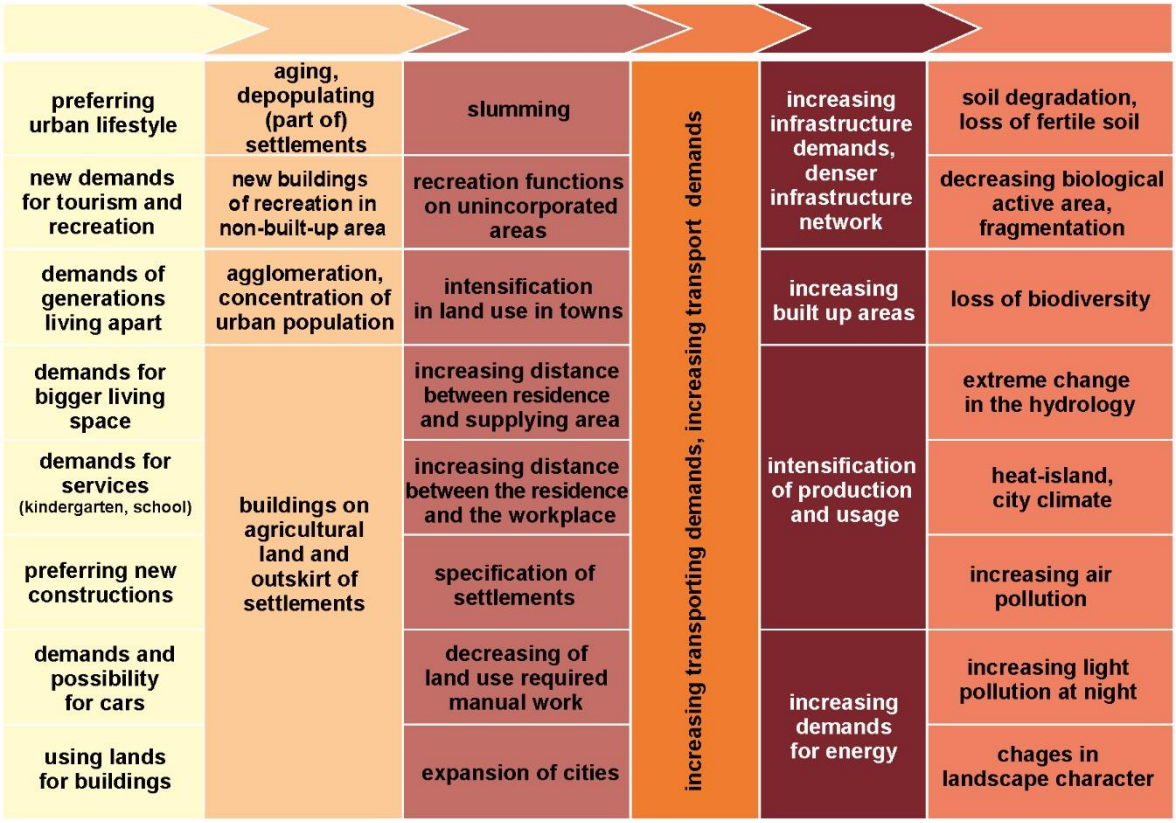


Figure 10 Simplified causal links between changed lifestyles and land uses

The key driver of migration into cities is the **demand for a new lifestyle**: generations living apart, construction of flats with larger floor space, and workplaces representing the changed lifestyles (Figure 10). The expansion of settlements which damages natural landscapes can be explained by the increased demands (an increase in the number and level of services) and the increased demand for new properties (e.g. favourable subsidies), and **by the economic advantages of using lands for building and by the neglected development or rehabilitation of brownfield areas.**

The separation of living and service areas also leads to the increase in the proportion of built and paved surfaces. Therefore, **uncultivated areas have continued to expand in spite of a decreasing population even** after 1980.

4.3.1.2 Expanding settlements and their impact on landscapes

In the first third of the 20th century, uncultivated areas, including settlements slightly exceeded 6% of the country's territory. From 1990 until now it increased from 11% to 22%, to the detriment of agricultural lands and green areas (grasslands, gardens, vineyards, orchards, arable lands).

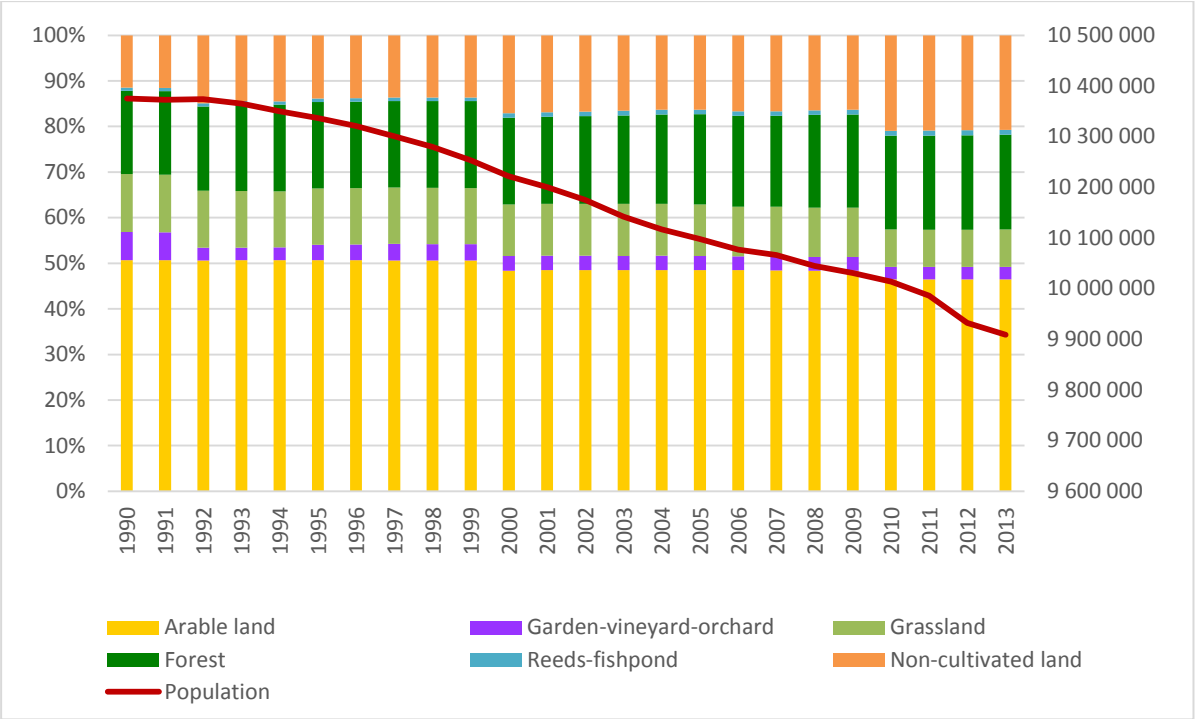


Figure 11 Evolution of land use and population between 1990 and 2013 based on the data of KSH. Source: Illyés et al. 2014

Focusing on the data between 1990 and 2013, it is striking that in spite of the permanent decrease in population, the proportion of areas withdrawn from cultivation continually increased.

Comparing the rate of 22% of withdrawn areas to the proportion of forests and the size of Natura 2000 areas, we can see that their size is identical by order of magnitude. It means that as a result of this evolution, the rate of the network composed of ecologically valuable components and areas bearing less ecological value or significantly transformed by man is roughly the same and these are the dominant components definitive to the spatial structure.

Satisfying the needs for residential housing and the associated services and infrastructure, as well as the efforts to create new jobs leads to the increase in the area of settlements and through this to the **transformation** and **relocation of the traditional outskirts of settlements**. The junction zone of unincorporated and incorporated areas, as well as the built areas and areas not intended to be built is permanently changing in settlements where population is increasing. Interfering facilities, plants and industries settle here. However small spots remain semi-natural areas, such as the bed of old watercourses, meanders, old gardens that are considered to be the last resort of animals between agricultural lands under intensive cultivation and the towns, and cities. Due to our increasing mobility, the bypasses built in response to the noise and vibration emitted by the transit traffic put an end to these habitats on the outskirts of settlements which created new long-term boundaries of expansion and relocating the outskirts of the settlement. This transformation of the outskirts of settlements is done to the detriment of former land use.

As buildings and paved surfaces occupy increasing areas, immense proportions of topsoil are destroyed and there is an **extreme change in the hydrology.** Infiltration on built or paved surfaces disappears locally, the runoff coefficient becomes worse and as their joint effect, the

shortened time of concentration causes the increase in flood discharge, even if precipitation does not change. Settlements expanding towards rivers (quite frequently the rows of houses on the river side of flood dikes) block flood drainage and the protection of these types of settlements during floods requires considerable efforts, and it sometimes costs more than the protected property.

The pace of withdrawing agricultural lands from cultivation decreased significantly especially since 2010. However there is a need for a further decrease in order to adjust area demands to the extent really required by the implementation of developments. There are no regulations motivating saving land. The land use plans imposed a limitation on delineating new settlement regions only in the conurbation of Budapest. In other regions of the country it is only prohibited in protected zones or the area of the settlement region is bound to conditions but no limitation on quantities is imposed. The size of arable lands taken into final use varies year by year. Each year 4,000-7,000 ha. of arable lands are finally withdrawn from cultivation for the purpose of investments, while the number of unused or under-used areas suitable for development is significant (NRDS). After 2009, investments made for industrial, commercial or mining and for providing services were "responsible for" using arable lands. Before 2009 another important reason was to establish areas withdrawn from cultivation in relation to the settlements. Due to the transformation of cultivated parcels into areas withdrawn from cultivation, and the increase in the number of targeted investment areas, the size of arable lands is foreseen to further decrease. Another factor is that the market value of arable lands may significantly increase after their reclassification as areas intended for construction.

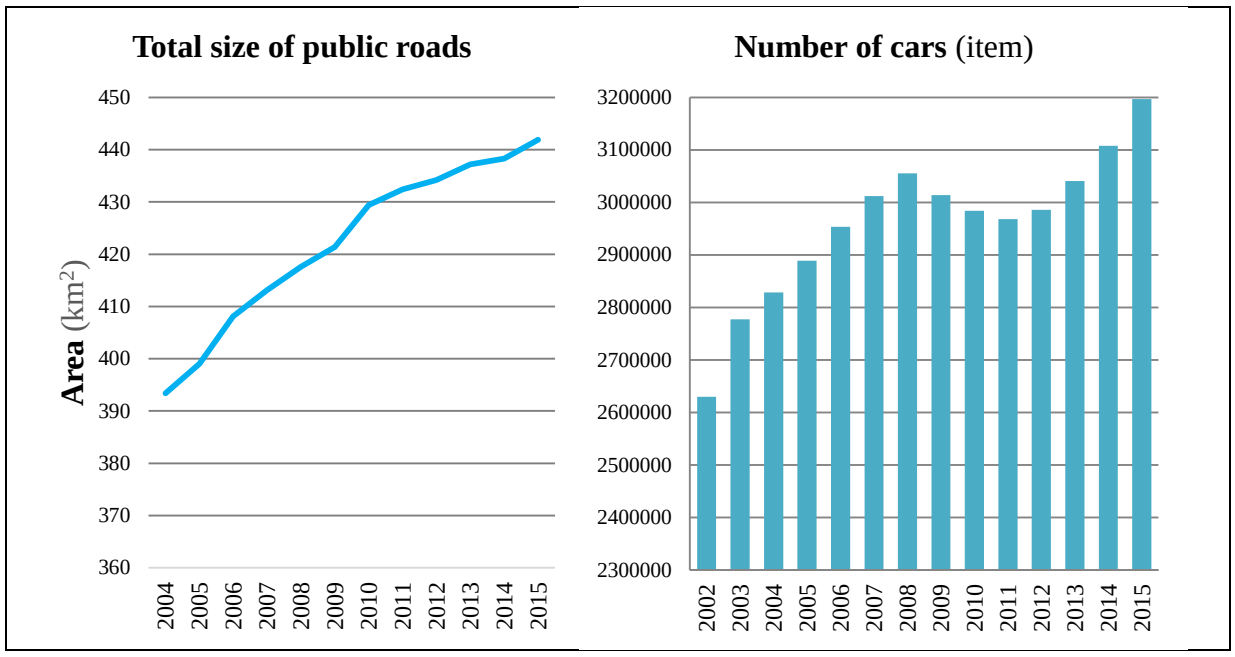


Figure 12 The increased need for mobility is evidenced by the increase in the number of cars and the total size of public roads Source: KSH

Through the general availability of cars and the development of public transport even greater distances between the residence and the workplace are surmountable on a daily basis. A direct consequence of the expansion of cities is the increased mobility which generates further transport infrastructure developments (Figure 12).

The fragmenting effect of new infrastructure developments may cause further damages. Green areas become fragmented, the functional relationship between them disappears, the resulting harmful effects magnify and the landscape structure changes to a significant extent especially around the outskirts of settlements.

The tendency of change in area use is different in the different regions of the country. In con-urban areas where the real estate value of lands is high, the increase in the settlements' size is typical while in regions with high depopulation (regions with small villages and homesteads) spontaneous changes occur due to the termination of cultivation. As the youth moved out of these localities, the population once taking care of the landscape aged and died out and the values they preserved, (e.g. homestead life, vineyards, orchards) began to reduce and their knowledge began to erode. In the course of this process, there was a significant drop in traditional landscape management and traditional land use, (e.g. grazing, viticulture, homestead farming) and the size of vineyard landscapes, as typical landscapes of Hungary, (the Pannonian Basin), is also decreasing.

Remarkable difference is shown in the intensity of uses inside cities. The higher proportion of built areas and the related paved surfaces, the increasing number of buildings and the immediate drainage of precipitation changes the climate conditions of cities to a great extent. This "**city climate**" is primarily the consequence of the lack of water balance due the high ratio of paved surfaces, the changed emission conditions due to the higher heat conductivity and heat capacity of paved surfaces compared to natural surfaces and of the air flow that changed due to the buildings. The emissions (heat, vapour, pollutants, etc.) from intensive human activities (transport, heating, industry) contribute to this. The negative effects of city climate, (temperature increase, lack of ventilation, difficulties in sizing drainage facilities), are most perceptible in densely built cities and mainly in paved city centres with only a few green surfaces and along main roads.

The intensity of the urban heat-island effect – the difference in the temperature within the city and on the unincorporated lands around it may reach 5-8°C in a city with a population of 150,000, while in cities with millions of inhabitants this difference may be 10-12°C. On a hot summer day, on a significant part of built-in city quarters in Budapest the perceived surface temperature is at least 10°C higher than the average surface temperature around the city. Large, flat-roof buildings (halls, railway terminals, shopping centres) and the surface of the paved areas is almost 15-18°C higher than the average surface temperature around the city (Ongjerth et al. 2011.).

Further from the incorporated areas, structures are erected on unincorporated areas as required by tourism or crop processing, traditionally a homestead. Building homesteads again is a great challenge before urban planning and the supporting systems. Apart from regions with homesteads that are to protected on a national level, **scattered buildings** further away from the centre of settlements may lead to numerous conflicts arising from the fact that they occupy land and from the difficulties associated with building and operating their infrastructure network. It also renders difficult the formation of **compact** settlements, that would be desirable for sustainability. German and Swiss examples show that to protect landscapes, emphasis should be laid on prevention, and on the safeguarding of unbuilt areas.

Through increasing urbanization, light pollution at night has also greatly increased. Thus there are ever fewer places where a clear starry sky can be enjoyed, without interfering artificial lights. Today, the light pollution of Budapest (Figure 13) is higher than that of Vienna, which

proves that in this respect we have reached the Western European level. Due to an increase in demand for lighting and the change in the lighting customs, light pollution affects ever larger areas with growing intensity. Light pollution reaches large distances. Its effects may be perceived from a distance of 100 km or even more. In addition to blocking the visibility of stars, light pollution is also harmful to nature: it causes problems in orientation and in the pace of life and it also brings about irreversible changes in many areas of life activities (e.g. nutrition, reproduction). Light pollution has adverse impacts on human health and the quality of life (Kolláth 2009; Gyarmathy 2015.).

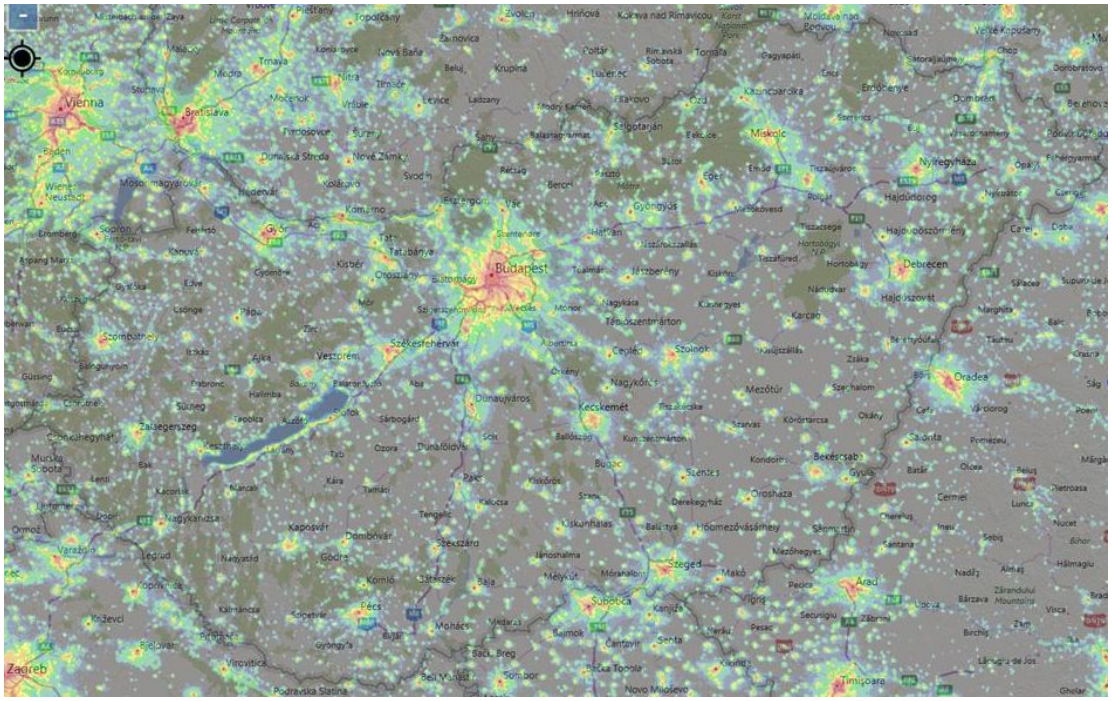


Figure 13 Indicative light pollution of Hungary (Satellite image, 2015)

Raw minerals and energy sources required to serve new infrastructure developments and the **increased mobility** demands can be covered by local mining extraction or by imports. Mining may greatly influence landscapes. Depending on the type of extracted raw materials, the mining technology used, and the different phases of mining, this effect is quite complex and varied. In the active phase of mining, the extraction works, increased traffic, the erection of the necessary facilities on the surface may have a negative impact on the landscape.

To minimize these impacts and for a responsible land use, it is important to extract only what we require. Another potential tool is to reduce demands. **Knowing the actual demands** is very important for a sustainable regulation.

After completing the excavations, the area is recultivated by taking into account the new landforms and the new water regime. Usually, the recovery does not allow for the complete reconstruction of the original landscape character. A properly planned recovery aims at balancing the former negative impacts and creates a (new) landscape function perfectly fitting into its environment.

Open-pit mining brings to the surface irreplaceable **geological, geomorphological and soil assets** valuable to science tourism nature conservation, culture and recreation.

Since the 1990s, there has been a very significant structural change in industry which decreased environmental damage on abandoned industrial sites. However the industrial sites, plants, factory chimneys, cooling towers and the logistics parks, freight stations, industrial

railway tracks, pipes, conveyor belts, distribution sites and the related depot sites remained on abandoned brownfield areas and rust belt areas as the remains of former land use. Landscape was often not rehabilitated so we still see the changed land formations created by the industrial activities (tailings, dams, tunnels, shafts, subsidence).

Nevertheless, new demands for industrial infrastructure arose again and again, e.g. for the utilization photovoltaic systems, wind farms and the related infrastructure. For their construction many conditions (technical, economic, ecological, arable land protection, aesthetic demands) must be simultaneously satisfied. Designers must do a lot of preparatory work to protect the landscape selecting the location of facilities occupying large areas, (e.g. new industrial parks), and fitting them into the landscape.

4.3.2 Environmental awareness, changes in landscape identity

Evaluation of the condition and services of the landscape is not properly represented in the set of values of Hungarian society. Increasing emphasis is laid on acquiring material values (partially because of advertisements urging increasing consumption and the behavioural patterns presented by the media) and the typical behaviour of the previous generations, such as cost saving and temperance, are no longer in the forefront. Efforts to raise environmental awareness with environmental education do not ensure overwhelming success. Hungarians share the general European opinion of the importance of the environment. The highest priority is attached to climate change but the decrease in biodiversity and non-sustainable consumption seem to be less important. To protect the environment, Hungarians take less specific steps (selective waste collection and management, moderating the use of energy, reducing water consumption, changing consumption habits) than the European average. A major part of the population perceives only those environmental problems, that are thrown into the spotlight by the media and is less sensitive to the environmental problems of their own residence (NEP).

National and community **identity** is getting **weaker** despite our extremely rich natural and cultural heritage, including but not limited to the Hungarian language, our folk traditions, the intellectual heritage of the Hungarians, as well as our archaeological and built heritage. As a result of significant differences in the individual value systems, there is a moral crisis in society. Traditions are strong but the negative habits are too. **The establishment of certified hungaricum treasures as well as the multilevel national depository system aims at reviving and enhancing national identity.** In the period since Act XXX of 2012 on Hungarian national values and Hungaricums came into effect, 19 county depositories and more than 900 settlement depositories were created with more than 1,369 county values and 5,863 settlement values on the register.

An **increasing percentage of the country's population** lives in urban areas. Based on the resident population and public administration status: 29.5% of the population lives in localities; 70.5% of the population lives in settlements having the legal status of a town. Many people spend a large part of their day confined in buildings. Therefore they **cannot gain first-hand experience on the landscape forming effects of their lifestyles** and they do not suffer from its direct consequences. Globalization also reduces the sense of belonging to someone/somewhere, independence from everybody comes to the forefront. Change and replacement are integral parts of our lives. Thus bonds are harder to form with natural and landscape assets that represent the feeling of home. There are no social surveys questionnaires that would reveal in detail the relationship of people to the landscape.

4.3.2.1 The approach of the digital society and the cyber generation to environment and their bond with landscapes

Our access to internet is increasing. In 2012, 70.6% of the population used internet and the rate of households with internet availability was 68.6%. Internet is widely used in cities and developed regions, while in rural and underdeveloped regions, the rate of the internet users is lower than the average (NDTC).

Soon the latest generation 'Z', having a completely new set of values, will also enter the world's operation. They are used to and they need a rapid flow of information. They live in the world through screens. Sometimes they know the landscapes of other continents better than their own environment. By choosing the right means, forms and notes, the members of generation Z are easy to contact. This can be used for influencing them both in positive and negative directions.

While young people almost depend on the internet, it is an actual problem in Hungary that the rate of digital illiteracy among the population over 15 years age is 44.5%. This rate is especially high in the face of the info-communication society, when certain contents or services are only available through the internet. The elderly, the unemployed and the disadvantaged people and people living in small settlements or having low levels of education have the biggest backlog in this regard (NDTC).

4.3.2.2 Responsibility of individuals and communities for the landscape

The sense of responsibility of people separated from the landscape gets weaker. Quite often they either don't recognize their own responsibility (due to its indirectness) **or recognize it too late**. Individuals do not see their own or the community's responsibility for the vanishing landscape heritage assets and they do not deal with the consequences as long as their own interests in their own subjective value systems are not threatened. Most people do not feel motivated to participate in decision making processes they are less inclined to take initiative. There is no set of means in the hands of communities related to landscape. The willingness of citizens and small communities to participate is weak. There are not enough active civil society organisations that are willing to work for the landscape and for the preservation of landscape heritage (NDTC).

Civil society organisations may be given a definitive role in shaping environmental awareness. Civil activity of a society is reflected by the data of its members in addition to the number of such organisations. In the past twenty years, the civil activity of the adult population has been decreasing. Today only one fourth of the members of civil society are active members of an organization, which is one of the lowest rates in the European Union. The number of the members of civil society organisations is unbalanced in the different regions. Half of the total number of civil society organisation members lived in the Central Hungarian region (mainly in Budapest). Alienation from the landscape is clearly reflected by the fact that the willingness of citizens and small communities to participate in landscape-related decision-making is low.

If communities recognise the exposure of landscape assets and if local and individual responsibilities are taken and local and individual initiatives meet, the communities are able to form the value system of land users living in their neighbourhoods and to influence their activities. The presence of organisations established by volunteers directly or indirectly for the

purpose of protecting the landscapes and working towards the preservation of traditional land uses nature parks is considered to be a strength. Such organisations are the Hungarian and international network of **nature parks**, the **geopark network** run under the aegis of UNESCO since 2015 and the starry sky parks.

4.3.2.3 The role of awareness raising in landscape formation

Landscape is an entity that carries information and has cultural heritage, artistic, scientific, educational, cultural and knowledge dissemination potentials. The intellectual sources of the landscape can be revealed to some experts or to a wider public with the help of archaeological sites, World Heritage sites, educational trails, thematic pathways, nature parks, geoparks, geological explorations, botanic gardens, sacral buildings or visitor centres.

The formation of the landscape is influenced on the long-term by the knowledge and approach provided by public education, higher education, vocational education and environmental education. The knowledge can strengthen and form the approach of interested groups but it cannot exert much influence on establishing bonds with the landscape.
Act CCIV of 2011 on national public education has regulations that specify the BA and MA courses that can be provided in higher education, higher level vocational courses, teacher training, the operation of doctoral schools, the accreditation of majors in higher education and the training and qualification requirements. In many fields of higher education, a modern approach to landscape is adopted and there is also a research and planning group committed to the landscape that can interpret the landscape in its complexity instead of following a sectoral and analytical way of thinking. The curricula of a significant part of Hungarian higher education contain knowledge that is indispensable for maintaining a lower environmental exposure and safeguarding our natural and cultural heritage. The higher education strategy entitled "Changing Gears in higher Education - a medium term policy strategy, 2016" emphasizes the importance of increasing the activity of higher education institutions in handling social challenges. The activities in the research institutions of higher education institutions is a basis for ensuring sustainable development

For laying the foundations of the operative tasks of Hungarian landscape management, new landscape guardian training will be launched who will have a complex approach to sustaining and taking care of areas and landscapes on the whole territory of the country.

Ensuring the long-term perspective of landscape research could contribute to the maintenance of our natural and cultural heritage of landscapes and to the success of the joint efforts of sectors, but the current state of landscape research is insufficient. Due to its complex nature, few state or community funds are available. Thus, there are only a few research studies on the landscape character and the internal operational features of landscape structure. Consequently, we have insufficient information on material- and energy-related processes in the landscape. Apart from a few exceptions, sectoral research does not examine the impacts of the implementation of the research on the landscape, the change of land use and thus they do not assess either its social or economic consequences.

In regulating the contents of public education, Act CXC of 2011 on national public education, refers to teaching environmental awareness. A responsible approach to our environment is also mentioned several times in the National Core Curriculum under the cultural domains

Man and Nature and Earth and Environment[6]. Tasks related to environmental education and forming part of the pedagogical programme of educational institutions are regulated by decree[7].
No audit was made in the field of education and training to examine whether or not the recommendations on education and training of the special committee of the Council of Europe responsible for landscape (CDCPP[8]) have been implemented.
In addition to the public education institutions, the public collections (libraries, museums, cultural institutions, civil society organisations, churches and the media also play a role in environmental education and raising awareness. National park directorates, forest holdings, nature parks, open-air schools, open-air nursery schools, Green Nursery Schools, Eco-school programmes, green paths and other green civil organisations occupy an important role in environmental education, training and awareness raising. The minister responsible for education and the minister responsible for environmental protection launch joint programmes to support the work related to environmental education and training and the implementation of the Open-air School Programme, the Open-air Nursery School Programme, the Green Nursery School Programme and the Eco-School Programme. These actions contribute greatly to the activities of educational institutions to raise awareness, transfer knowledge and change attitudes.

The engagement of national park directorates and civil organisations in documenting knowledge related to the landscape management of our heritage may contribute to the integration of heritage-related knowledge into education, supporting the survival of certain rare professions associated with land use that are about to disappear, and the preservation of their associated knowledge. In addition to the data collection about individual landscape assets by the national park directorates, the community-based assessment and preservation of landscape assets reinforces the interest of local communities in their landscape identity and their bonds with their homes.

The award established for local municipalities, municipal corporations and civil society organisations in recognition of the activities they carry out for the protection, management and planning of Hungarian Landscapes is **Magyar Tájdíj** (Hungarian Landscape Award). This award can be given to organisations for the implementation of an outstanding programme aiming at the safeguarding and development of Hungarian landscapes and for performing the associated education and awareness raising activities. The travelling exhibition entitled **Táji örökségünk megőrzéséért** (For preserving our landscape heritage) makes available such exemplary activities to the public as the *Implementation of a Complex Landscape and Nature Management Programme in the Zámoly Basin; The protection of the Natural Assets and Values of Cultural History of Bükkalja; Landscape Protection and Landscape Management in Gerecse Nature Park an in the Által-ér Valley; Mesés Hetés Zöldút - a model programme for taking inventory of individual landscape assets and their actual protection through the creation of a transboundary green path*. This latter activity was recognized as a "best practice" on the international level when the model programme of Hetés won the Landscape Award of the Council of Europe in 2015.

[6] Government Decree 110/2012 (4 June) on the issuance, implementation and application of the National Core Curriculum
[7] Decree 20/2012 (31 August) EMMI of the Minister of Human Capacities on the operation of educational institutions and the use of name of public education institutions
[8] Steering Committee for Culture, Heritage and Landscape

4.3.3 Impacts of changes in ownership

The changes in ownership and the utilization of areas have a definitive role affecting the efficiency of landscape protection. Lands were nationalised after 1945 but the lands obtained during the privatisation following the regime change were not owned through several generations and therefore the traditional bonds with the landscape could not be created.

The transformation of agriculture is a several decade long process. The number of individual farmers engaged in agriculture dropped significantly; the number of such farms has been halved since 2000. The number of agricultural organisations has not changed significantly. In 2013, the average size of farms using agricultural lands owned by agricultural organisations was 308 ha, and those owned by individual farmers was 5.4 ha. Since 2010 the average size of agricultural lands owned by organisations decreased by 5% and that of the individual farmers increased by 12% (from 4.6 ha to 5.4 ha) (KSH). Individual farmers concentrated their land holdings, while we can assume a decrease in the size of lands owned by agricultural organisations.

In addition to over-utilization, on certain areas there is a significant under-utilization (owing partly to the high rate of undivided common lands) and the existence of abandoned lands. The start of spontaneous processes threatening the sustainability of adjacent areas may represent a risk to plant protection (e.g. spreading of invasive species). Due to the changes in land ownership, bonds with the landscape are loose or missing and man's relationship to the landscape and nature gradually weakens.

Following the establishment of collective farms in the 1960s, areas that were not suitable for large-scale production were divided into parcels and cultivated parcels were created, (a total of approximately 200,000 ha). These small parcelled vineyards, orchards or vegetable gardens cultivated with traditional cultivation methods by local residents added a patchwork landscape pattern to the outskirts of settlements. By now these cultivated parcels have become holiday or residential areas and the majority of these parcels turned into neglected, weedy areas covered with invasive species.

During privatisation, the formerly **ameliorated systems fell apar**t. In some cases, society and the state were expected to establish and operate unsustainable water management systems due to land uses that were not properly adjusted to the natural configurations owing to the ownership relations.

The change in land ownership upon the regime change meant that binding requirements on the management of **nature reserves** should be laid down as soon as possible. 72% of nature reserves under national protection are owned by the state, while 28% are in the hands of private owners. The asset managers of 29% of state owned nature reserves are the national park directorates. On half of their areas, the directorates perform their nature conservation duties on their own and on the other half they involve local farmers through lease contracts containing the priority of the conservation of natural assets. Another 43% is either managed by state asset managers (mainly private forestry companies) or is utilized through lease contracts of the entities exercising ownership rights which contribute to rural employment (NRDS).

Important watercourses, lakes and their beds and subsurface waters (hereinafter: water) are owned exclusively by the state and are managed by the water directorates. In addition, the

state also owns channels, reservoirs, main flood protection lines and other water facilities, including many water utility infrastructures. Water is an important component of a landscape; therefore its management is a fundamental determinant of the state of the landscape. Nevertheless, landscape management and land use activities on river basins determine the quantitative and qualitative state of waters as well.

4.3.4 Landscape-related set of Hungarian regulatory and planning means

Landscape is rather fragmented in Hungarian public administration: it is equally fragmented in terms of the protection, development, management and planning institutions, the responsibilities and the applicable legislation. The current structure does not correspond to the integrated approach of the European Landscape Convention.
Act CXI of 2007 on the Promulgation of the European Landscape Convention dated in Florence on 20 October, 2000 does not contain authorization for drawing up a substantive legal regulation specifying the detailed rules of implementation; it only provides for the designation of persons responsible for certain actions required for the implementation under *Notifications* included in the *Final Clauses*[9]. It is important to highlight that during the implementation it was pointed out many times that the definition of responsibilities is incomplete. It is also important to emphasize that the Landscape Convention was transposed into national law in an imperfect and contradictory manner. Implementation has not yet eliminated differences in territorial scope, and still needs to set the objectives related to Hungarian landscape by consensus, and to develop a set of tools to ensure the achievement of consensus-based landscape policy goals. When the act promulgating the Landscape Convention came into force, a dual definition of landscape protection emerged since landscape protection that is integrated into the organisational structure of nature conservation is only partly consistent with landscape protection as defined by the Council of Europe and the tasks and means assumed in Act LIII of 1996 on nature conservation are just partly sufficient to satisfy the requirements of the Convention.

Further legislation with a focus on the protection-planning-management of landscapes:

- Act XXI of 1996 on regional development and land use planning;
- Act LXXVIII of 1997 on the formation and protection of the built environment;
- Act LXIV of 2001 on the protection of cultural heritage;
- Act CXXIX of 2007 on the protection of arable lands;
- Act XXXVII of 2009 on forests, on forest protection and forest management;
- Act XXVI of 2003 on the national spatial plan;
- Act LXXVII of 2011 on World Heritage;
- Act LXXIV of 2016 on townscape protection;
- Act XLVIII of 1993 on mining;
- Act CX of 2012 on the Promulgation of the Council of Europe Framework Convention on the Value of Cultural Heritage for Society accepted in Faro.

Under the current planning scheme, landscape-related matters are integrated into the national and regional land use plans on the national and county level and into urban development plans in settlements. On both levels acts name the harmonized interests of environmental, nature and *landscape protection*, as well as the formation of *land use*, *landscape structure* and the

[9] The minister responsible for nature conservation shall provide for the implementation of this Act in agreement with the minister responsible for cultural heritage protection and in cooperation with the minister responsible for territorial development and the minister responsible for spatial planning.

view of the landscape, but the works to be performed by the different specialist fields have a subordinated role. The system of plans serving landscape level planning, the protection and utilization of landscapes, has been created from a series of different-level hierarchic landscape plans.

Modern geographical information technologies have a minor role in the process of landscape evaluation, (load bearing capacity, environmental assessment). The outcome of the evaluation is does not sufficiently refer back to the planning process and there is no conflict management or conflict resolution related to area use. The efficiency of landscape evaluation is low. In urban development planning, historical conclusions and conclusions related to landscape structure, and the individual features of a given landscape are not drawn. Adjustment to the *landscape type* is not represented during urban development planning, area use planning and the regulatory processes. The legal regulations on urban development planning specify a vague framework related to landscapes. The means of urban development focus primarily on construction regulations. There is a need for further planning means in order to be able to exert real influence on land use.

There is an ongoing policy debate about which state administration bodies are responsible for ensuring compliance with the enforcement of landscape protection measures integrated into the development plans due to the integration of protection tasks. Because of the disputed and shared responsibilities, the blocks to information flow and the lack of local professional competence, the means of landscape protection are not efficient in urban development and that may also adversely influence the outcome of individual processes. This is especially true because the urban development concepts often do not take into account the actual local configurations, are one-dimensional and less focused on the efficient use of local opportunities. No proper professional background is available at the regional and municipal level.

The list, description and presentation of landscapes based on their character (landscape inventory) is also missing, just like the definition of the related quality objectives and regional planning which rely on them. The landscape-related registration systems are burdened with problems related to financing, access, data upload, data maintenance, system maintenance and compatibility.

The set of nature conservation criteria can be enforced in urban planning and in the processes of individual authorities mainly as a result of the obligations towards the EU, but landscape protection is still to be reinforced because of the lack of duly qualified experts and detailed rules.

Other areas which need to be strengthened are the planning, licensing (system of experts, technical inspectors and contractor’s technical inspectors) and regulation of green surfaces on incorporated areas and the comprehensive technical criteria applicable to the planning of green surfaces in settlements, (e.g. size of green area per capita, maximization of the distance of accessing green areas from residential areas, minimum area required for the local rainwater utilization. There are also deficiencies in the economic evaluation of the impact of green surfaces on the climate of settlements, the climate modification, soil protection, water protection etc. effects of green infrastructure on unincorporated lands.

The Integrated Urban Development Strategy (IUDS) allows for the reinforcement of a complex approach. A However, owing to the time frames of the methodology under

development and the drafting, (many times supported in a campaign-like manner), the efficiency of results is often inadequate.
The management and planning of landscapes not under special protection is currently not integrated into the sectoral legal regulations, such as Act LVII of 1995 on water management and landscape protection requirements are also represented only formally in the implementing decrees. The water management regulatory instruments have no or just indirect impacts on area use adapted to natural configurations, thus currently the water sector cannot really influence the activities carried out in river basins. As result, in case of waters managed by the state, only protective mechanisms can be implemented, the opportunity for prevention and risk mitigation is limited. The objective of the National Water strategy is the establishment of causal water management that lays more emphasis on prevention as well.

In Hungary, there is no general obligation for the development of management plans for each settlement or region. The obligation to develop management plans applies only to protected nature reserves, World Heritage sites and areas.
The requirements on the content include works related to the preservation and maintenance of landscapes and landscape assets. The nature conservation management plans of protected nature reserves contain the forms of nature conservation management serving the safeguarding, the maintenance, the recovery and the presentation of protected nature reserves and natural assets, and the restrictions, prohibitions and other obligations specified to complete these activities and the provisions applicable to them. Pursuant to the provisions of the Nature Conservation Act, the nature conservation management plans must be promulgated by way of legal regulations (ministerial decrees) and the provisions of nature conservation management plans are binding.
The outstanding universal value of many World Heritage sites in Hungary is closely linked with the landscape. Thus the world heritage management plans are also one means of safeguarding landscape assets.

4.3.5 Economic incentives and funding schemes defining the type and state of Hungarian landscapes

Prior to our accession to the EU in 2004, landscape formation processes were primarily financed from the state budget. The state spent its own funds and funds from loans on economic incentives and funding schemes. The accession to the EU in 2004 has fundamentally changed the possibilities for funding as EU funding sources were made available to us (European Regional Development Fund, INTERREG, Common Agricultural Policy, Cohesion Fund, Horizon 2020, Connecting Europe Facility, European Maritime and Fisheries Fund, European Agricultural Fund for Rural Development, European Agricultural Guarantee Fund, LIFE).

The largest funds available to Hungary are represented by the development funds of the European Union. During the former economic period of the EU, the state spent nearly half of the support funds on directly supporting the actors of different sectors. It spent nearly the same, but a slightly lower amount on tax exemptions, while in proportion of the rest of the instruments remained much lower. The rate of tax exemptions in Hungary is 47% but 90%, if the benefits are enjoyed by foreign companies (NDTC).

The funds offer an opportunity to several sectors to implement their sectoral plans. After the Cohesion Funds, the EAFRD and the EAGF funds of the Common Agricultural Policy provide Hungary with the highest amounts of funding. Between 2014-2020, Hungary received

EUR 12.3 billion of which EUR 8.9 billion is granted to farmers on a normative basis, while the majority of the rural development funds of EUR 3.4 billion may be spent on developments.
Characteristic elements of Hungarian state aid policy are the aids implemented through individual government decisions which rely on granting financial support to investors carrying out investment projects that are highly import to our national economy. Between 2003 and 2010 nearly HUF 100 billion were granted as non-refundable funds (NDTC) from the central budget for the implementation of such investments in Hungary. The selection of target areas of investments is highly important to our national economy which relies on geo-economic foundations.

Financial support strengthening green farming and sustainable land use and landscape management, (e.g. agricultural practices beneficial from climate and environmental aspects - Greening, agri-environmental sub-measures) motivate the farmers to use agricultural production methods on agricultural lands that are compatible with the sustainable, efficient and wise utilization of the landscape and the natural resources. The Common Agricultural Policy can stimulate favourable changes in agricultural land use and, in the rural landscapes through its binding requirements related to the payments and through payments made against voluntary commitments (e.g. AKG - MTÉT) available to the farmers.

The framework for cross compliance, Decree 50/2008 (24 April) FVM of the Minister of Agriculture and Rural Development on the criteria required for sustaining good agricultural and environmental conditions (GAEC) to be satisfied for applications under the single area payment schemes and for certain rural development funds and on the definition of the conversion rates of animals to livestock units contains provisions on landscape preservation and the protection and safeguarding of habitats. Greening, laid down in the Decree 50/2008 (24 April) FVM, allowed for the implementation of positive incentives with the objective of landscape protection and that made the protection of landscape components associated with farming compulsory in the course of land usage. Consequently, farmers enjoying funds must provide for not disturbing of **Cumanian Barrows** (tumulii), the conservation of **shadoofs** and **groups of trees and bushes**, as well as for the protection of the **river banks and lake shores.**

As a result of the latest reform of Common Agricultural Policy, from 2015 *Decree 10/2015 (13 March) FM of the Minister of Agriculture on the rules of applying for funds offered for agricultural practices beneficial from the aspect of climate and environment, and on the requirements on maintaining arable lands, permanent grasslands and permanent croplands in a state suitable for cultivation or grazing* facilitates crop diversification of agricultural areas and the conservation of permanent grasslands and certain landscape elements that represent the patchwork pattern of the landscape. **Greening** practices are **crop diversification**, the **maintenance of permanent grasslands** and the **identification of ecological focus areas**. **Crop diversification** is a requirement beyond crop rotation which means that farmers must grow one crop on arable lands of less than 10 ha, at least two different crops on lands between 10 and 30ha and three different crops on lands of more than 30 ha. Fallow lands and transitory grasslands are considered as one crop. For the **maintenance of the proportion of permanent grasslands**, the EU regulation provides that in 2015 the size of grasslands may drop only by 5 percent on a country level compared to the reference rate reported to the European Commission. Nevertheless, in environmentally sensitive grasslands, (classified as Natura 2000 areas), every single plot of land must be conserved and may be ploughed only if permitted by the nature conservation authority. The purpose of **identifying ecological focus areas** is to preserve and improve biodiversity of agricultural holdings. Therefore, in order to

achieve the ecological objectives, in addition to establishing/identifying ecological focus areas on cultivated arable lands, uncultivated but ecologically useful areas adjacent to arable lands may also be identified. This satisfies the requirement. The ecological focus areas may be composed of areas having a direct and favourable impact on biodiversity, (e.g. fallow lands, terraces, protective zones), and of areas that have indirect influence on biodiversity through minor agricultural use, (successive crops of ecological importance). These identification obligations are to be satisfied by farmers who cultivate arable lands of more than 15 ha. Greening measures and their territorial coverage may be expected to allow for the conservation of remaining elements of the agricultural ecological network and an increase in the stability of the network. Fitting green surfaces created or preserved through greening into the Hungarian green infrastructure network requires them to be coordinated.
In the past decades, partially due to the simplified single area payment scheme, farmers made efforts to maximize their agricultural lands in many cases to the detriment of habitats in the surrounding field margins (balks, ditch banks, smaller grasslands). Optional measures influencing the formation of landscape are available mainly through the rural development pillar of the Common Agricultural Policy.
In 2015, on the largest part of ecological focus areas, the farmers committed to cultivate nitrogen-fixing crops, plant successive crops of ecological importance and to leave lands fallow. These three represent nearly 90% of all ecological focus areas. So, the farmers typically satisfied the greening requirements with work on their own land.

The possibility for establishing buffer strips along water courses and their regulation in GAEC were the first steps of crucial importance for the ecological recovery of the river banks. Since 2015 they have played an important role in greening.

It is reasonable to assess the opportunity for identifying the buffer strips along water courses and areas exposed to water (low lying areas exposed to floods) as EFA areas[10] in order to grant sufficient space for water (which is in fact indispensable in the landscape) and to exploit the capacity of the landscape to balance the extremities of water management and, at the same time, to adapt to our hydrology more than we currently do.
Under the first pillar we are obliged to spend 30% of the annual gross budget on greening. This amount exceeds EUR 400 million per year.
Among the payments, the **agri-environmental payments** are also significant considering their impact on landscape and their territorial coverage. Under the agri-environmental payments, the farmers voluntarily undertake to abide by the environmental and nature conservation regulations limiting their farming. They receive single area payments in proportion to the extra costs and loss of revenue arising from such requirements. Based on the data of payment applications received on the single application form in 2016 (query made on 28 September), the farmers applied for agri-environmental payments for a total of 642,670 ha under the 2015 measure and 226,782 ha under the 2016 measure. Farmers applied for support for organic farming for a total of 129,867 ha. The measures entitled agri-environmental payments and support for organic farming were included under the same title in the previous programming period (2007-2013) and applications were made for a total area of 1,102,924.35

[10] Conditions that can be set from the aspect of water protection and that also give priority criteria for the location of landscape elements that can be used on EFA areas:

- if the area is adjacent to a water course then, through the establishment of an ecological focus area should widen the buffer strip to be established also under the current legislation;
- the area to be established should be perpendicular to the direction of the runoff on sloped areas;
- the EFA landscape element should be located on the area designated as exposed to excess water and in the flood bed on plain areas with excess water.

ha (final report of the New Hungary Rural Development Programme - NHRDP). In 2016, a new agri-environmental (AKG) call was published for which grant applications could be submitted for two thematic groups of requirements. There were1,697 applications for horizontal arable lands and 2,863 applications for a total area of 29,679 ha under the horizontal cultivation thematic group of requirements. Among the impacts of agri-environmental payments on landscape, we must point out the protection of margin habitats, the upkeep of varied crop ratios, the application of environment-friendly plant protection products, the moderate fertilization and the special nature conservation measures (e.g. late mowing, or keeping an unmoved strip). An indirect impact of the measure, which may be even more important than the direct ones, is the survival of the alternative to extensive farming methods.

Natura 2000 compensation payments, which are smaller-scale payments (though their impact on the landscape can be considered high) are available in relation to grasslands and forests. Their function is to compensate for the farming limitations imposed by the implementation of the Birds and Habitats Directives in Hungary. Their relation to landscapes is worth mentioning due to the preservation of grasslands and the expansion of semi-natural forestry. Payments were made for approximately 300,000 ha of grasslands. The size of forests varies depending on the type of nature conservation limitation provided for by the forest plan decision.

The support granted to organic farming in relation to landscape is also highly important because of the maintenance of the extensive, environment-friendly farming methods. Around 100,000-200,000 ha of land is expected to qualify for a subsidy as organic farms in the period 2015-2020.

Subsidizing non-productive investments aiming at the development of habitats and at water protection may be important for the formation of rural landscapes Non-productive investments aiming at the development of habitats can support farmers in establishing fallows, bee pastures, hedges and grasslands. Payment is closely linked to the agri-environmental payments, and supports their implementation. For non-productive investments aiming at water protection, facilities for the detention of water and/or protecting against erosion, buffer zones along river banks and wetlands can be established. Although the objectives set and headings for non-productive investments are adequate, farmers do not consider their use as a priority. In the previous grant period, farmers showed little interest in similar measures (although such measures may play a significant role locally). Therefore their effect at the country level is expected to be low.

Among the **forestry support plans,** the most important measures are the afforestation of agricultural lands which may lead to a change in the landscape character especially on the plains. The support of agroforestry systems is less important due to the small size of areas involved, while forest environmental management payments contribute to the preservation of the landscape assets of rural areas through the maintenance of semi-natural forestry.

Decree 104/2009 (5 August) FVM of the Minister of Agriculture and Rural Development on the state recognition of landraces and on the conditions for producing and marketing their seeds is an incentive to produce more diverse cultures adapted to the landscape configuration since these applications are free. Landraces are to be maintained in the region where their traditional cultivation is proven.

Summary - summary of the impacts of economic incentives on landscapes

International experience shows that support plans that do not take into account landscape configuration and changes in land use also assist the spread and survival of invasive alien plant and animal species, or increase flood risk or cause hidden economic damage as a result of increased light pollution. The landscape character and ecosystem value and services must be represented in the economic developments.

Any non-repayable support significantly reduces the risks of beneficiaries; thus, there is less risk, which leads to the increase of applications for the supports. Since the majority of supports lays the foundations for satisfying the special needs of a certain sector, despite the best intentions, the support scheme may contain incentives which generate cost increases in another sector. It should also be considered that a major part of investments are greenfield investments, i.e. they are implemented on unbuilt areas withdrawn from cultivation. The supports may also produce side effects that are favourable to other sectors.

Currently the support plans do not contain a decision-making tool that relies on data or databases related to the landscapes and that would lay the foundations for feedback necessary for fine tuning the criteria of support and for their territorial orientation.

Taking a different approach: the elimination of support schemes could also have an impact on landscape formation. For example, the economic support scheme (the recultivation fund of the Environmental Fund Provision - KAC) supports or motivates the performance of landscaping work that cannot be passed on to mining companies and the recovery of the landscape picture was eliminated.

I It is clear that support policies that are more aware of the environment and landscapes already have keystones and partial achievements, e.g. the Farm Development Programme, Village Producer Programme – Cultivated Parcel Revitalization Programme, Green Infrastructure Development and Maintenance Action Plan, rehabilitation of brownfield areas, green city programme, sustainable urban development, sustainable urban transport development, rehabilitation of degraded urban areas of towns, with the status of a county habitat developments or the reconstruction of habitats. At the same time, looking at the future, it is necessary to examine how the support policy and landscape protection can be harmonized and to set spending priorities.

4.4 The condition of Hungarian landscapes

Approximately half of the Hungarian landscapes are average landscapes and a fourth of them are intensively used landscapes in a degraded condition. The remaining fourth of landscapes are semi-natural landscapes under extensive cultivation offering nicer aesthetics and producing the typically positive psychological effects that are mainly exerted by surfaces covered with plants or water through view, nice sounds, good thermal sensations, associations, colours, natural shapes, etc. Considering their quality and values, the built heritage in Hungary is of European, international rank, however they bear limited aesthetic value due to their condition, the lack of their proper, scientific renovation, the disorder in their surroundings and their inconsistent or missing utilization.

4.4.1 Biogeographical features and landscape structure

Hungary lies on a weather boundary, its landscapes are characterised by diverse land surface forms (plains, hills and mountains alike) and as a consequence of these two features, the large-scale zones of the Pannonian Basin are replaced by a small-scale patchwork pattern. The flora and fauna is characterized by a heterogeneity that is associated with the geographical location and the morphological fragmentation of the country. In general, we look at patchwork landscape as a value. For example on Hortobágy, the only vast, unbroken grassy plain of Central Europe, the uniformity, openness and the unbroken horizon of the landscape are the features to be safeguarded. Each of the Hungarian landscapes has its own typical and unique features. The favourable features to be preserved must be specified for each landscape individually. Due to its uniqueness, the Pannon Biogeographical Regions is specified as an individual unit in the international literature. A major part of its territory lies within the borders of our country, thus preserving its values is not only a national but also an international obligation.

Except for the areas that are becoming conurbations, the proportion of unbuilt areas is relatively low. Both the semi-natural areas and land uses associated with production are characterised by diversity.

The key organizing element of the network of settlements was originally water. The unique, historical settlement structure, (e.g. homesteads on the Great Plain, tiny villages and small towns in Transdanubia) is under transformation, landscape structure and settlement structure are both at risk of becoming homogeneous. **Favourable landscape conditions**, the **diversity of landscapes** and the **landscape image are important resources** that facilitate business activities, create jobs and are the **basis of our well-being**.

4.4.2 Regulatory, protective and utilization functions in Hungarian landscapes

The value of nature and ecosystem services is not determined either on the national level or broken down into ecosystem services or in an integrated way. Despite this, it can be ascertained that the ecosystem services potential of landscapes is extremely focused on exploiting the supply services. It can also be ascertained that regulatory and mitigating landscape services disappeared in general at the national level.

The lack of regulatory and mitigating effects results in a decrease of well-being. In addition to the low level of natural capital, a deficit of ecological origins accumulates. To compensate for damages arising from the ecological deficit, the state uses increasing amounts of funds.

The current homogeneous land and water usage is not adequate to satisfy the requirements for the functioning of the landscape and society. This overloads flood and inland excess water protection and permanently decreases strategic water resources. The indicators of certain rural areas that are poorer than the average are proven to have a link with the state of land use and water management.

4.4.2.1 Regulatory functions in Hungarian landscapes

According to the MÉTA[11] database, only about 17% of the country is covered with vegetation that are parts of our natural vegetation heritage, i.e. can be considered to be the remainder of the natural vegetation. Looking at the condition of our vegetation heritage, we see that as a result of human utilization over the past millennia, only 0.6% of the territory of the country is covered with a vegetation that can be considered natural, another 5.6% is covered with semi-natural vegetation, while on 8.1% of the area vegetation is degraded and on another 3.0% it is extremely degraded. It means that on a major part of Hungarian landscapes, regulatory functions, (e.g. climate regulation, water regulation) are either not fulfilled or limited. The water regime of many landscapes is distorted. Here floods, inland excess water and droughts can equally occur within a short time. Figure 14 shows the rate of areas with semi-natural habitats at settlement resolution.

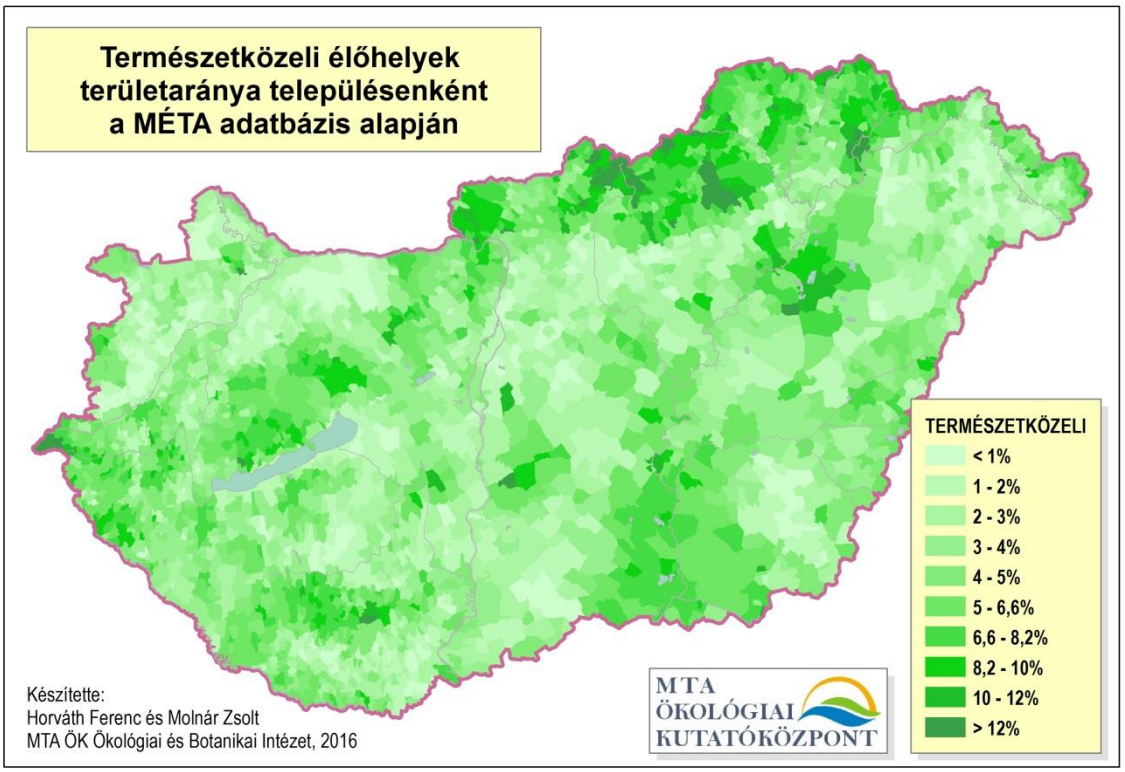


Figure 14 Rate of semi-natural areas on the different settlements based on the MÉTA database (Centre for Ecological Research Institute of Ecology and Botany, Hungarian Academy of Sciences)

By further reducing biologically active surfaces, the areas fulfilling a regulatory function also decrease. This is expected to intensify the effects of climate change, (e.g. natural occurrence of non-indigenous species, spreading of invasive alien species, transformation of the species composition of natural communities). The spreading of invasive species leads to the extinction of indigenous species, the loss of natural habitats and changes in the landscape

[11] MÉTA programme (Landscape Ecological Vegetation Database & Map of Hungary, Centre for Ecological Research Institute of Ecology and Botany, Hungarian Academy of Sciences, http://www.novenyzetiterkep.hu). Its main goals are to make a comprehensive survey and database of the actual state of natural & semi-natural vegetation of Hungary, and to make a scientific evaluation of the natural vegetation heritage.

structure and taking the harmful effects into account (e.g. ragweed allergy). All these combined may also result in severe economic damage.

Maintaining the regulatory functions also requires international cooperation because the undesirable effects of water management and land utilization in the neighbouring countries may strongly influence the water regime of Hungary and indirectly our climate due to the fact that our country is located in a basin.

4.4.2.2 Protective functions in Hungarian landscapes

The different sectors designated many areas with protective functions, (protected zones, protected areas, buffer zones, etc.) in order to operate the regulatory or supply functions or to separate them. Thus, ensuring the operation of regulatory and supply functions on a permanent basis relies on restrictions in many cases. Some of them are promulgated by law and substantive legal regulations also apply to the areas and other regulations are only part of sectoral planning. In general, land uses that are compatible or incompatible with the protective functions can be assigned to the protective functions. Existing improper land uses can rarely be changed. As an opposite process, among adverse land uses, building up the areas threaten the operation of many protective functions, (e.g. flood risk). Economic functions do not support the preservation, establishment of protective functions, (e.g. shelter belts, water protection buffer zones, etc.), that do not produce profit. Due to the full utilization of available lands, it is difficult to set up protective zones (ploughing up to the riverbed, felling lines of trees along roads).There is a need to set up and emphasize the indirect added value of protective functions and to mark out the necessary areas so that the buffer zones could resolve conflicts in land use occurring at the junction of different area uses.

In protective zones and buffer zones separating the source of loading and the affected parties, not all the regulatory functions are fully and necessarily available but one or more regulatory functions have a particular importance. For instance, creation of woodlands around industrial facilities does not necessarily carry ecological value and or aid pollination, but it is highly important for the water regime and atmosphere regulation as well as fitting into the landscape.

Often the protective functions have multiple overlaps, but in many cases even legal regulations seem to be insufficient because such functions are only partially indicted on title deeds and in the complex network of registries. Thus the principle of prevention cannot necessarily be enforced in regional and urban planning or in individual official proceedings. Recording the legal nature listed under Section 39/A of Decree 109/1999 (29 December) FVM aligns the actual condition of the areas and the contents of its title deeds and also increases legal certainty. For the operation of regulatory and supply functions, it is important to improve the availability and the coherence of registrations, to enforce the principle of prevention and to audit the surface coverage and land use on areas with a protective function in order to satisfy the long-term interests of society.

4.4.2.3 Utilization functions in Hungarian landscapes

Settlement function

In many places the typical spatial structure with a clear separation between built and unbuilt areas was preserved which is a key to the sustainability of settlements (establishment of compact settlements). Areas with weekend homes and small gardens situated mainly around cities, conurbations and recreational areas are also typical landscape elements of our country.

The landscape, the townscape and the street view are ordinary in most settlements, but in settlements suffering from depopulation, degradation is visible even in the centre of the settlement. The migration targets, the cities are weakly embedded in the landscape. New constructions that can determine the street view for 40-100 years are often completed without the intention of being adjusted to the landscape. There is no adjustment to the site configuration, and the community norms related to the use of materials, the scale and the set of colours used are under transformation in the continually changing world of modern materials and new technologies. All this is complemented by the grid of air cables that are also determining factors of street views. The outskirts of Hungarian settlements, the "settlement gates" are mostly orderly both functionally and aesthetically speaking. The practice of fitting the building into the landscape should be facilitated through using the means of visual culture for shaping approaches and attitudes to allow for the settlement to determine their image for themselves through the aesthetic harmonization of their traditions and the new functions. To this end, Act LXXIV of 2016 on townscape protection introduced new means for ensuring townscape protection, (municipal decrees on townscape, townscape profile guidelines), in order to preserve the typical and valuable architectural value of our settlements The local decrees stipulate the territorial and individual protection of local architectural heritage as well as the requirements that are definitive of the landscape based on the landscape structure, landscape character, landscape components and other local configurations. However, among the specifications related to the formation of the landscape quality both architectural provisions and requirements related to the formation of public areas and green surfaces are included. Their objective is to achieve landscape image protection at the local level with the involvement of the general public.

On 1 January, 2016, the housing stock comprised 4.4 million flats (KSH) half of which has 2.5 or more rooms. Set against the population size, there are no quantity problems with flats. Therefore instead of the expansion of settlements, the task is to renew the existing built areas because of the condition of the housing stock and especially their unfavourable energy characteristics. A new challenge is warming. To reduce this, urban planning, architects, landscape architects and the construction business must find new solutions towards sustainability.

A challenge facing urban planning, construction affairs and heritage protection is to achieve the renovation of cultural heritage elements (e.g. palaces, castles and castle ruins) and public institutions according to how they are embedded in the landscape and through integrated planning together with their environment.

We do not have up-to-date surveys or a single register about brownfield areas and that prevents the targeted planning and supporting of rehabilitation. To achieve compact settlements, it is important to establish a register of brownfield investments on incorporated lands, to assess their suitability and to re-fit them functionally into the settlement structure.

The registration of unused buildings and structures, the evaluation of their suitability and deciding their fate based on the suitability evaluation all are equally important. There is no register available about the unused buildings, structures or rust belt areas on either a national or settlement and municipal level.

In the past, the establishment of water management systems was primarily driven by a desire to rapidly drain the excess water deemed harmful and to restrain floods. Rainwater

management must be improved. The design of water management systems of settlements areas does not follow the water collection approach and the facilities/water uses do not take into account the existing renewable water resources. It is worsened by the fact that the size of biologically active surfaces in residential areas and public areas has shrunk.

Consequently, keeping and using rainwater in the settlements must be increased through replacing a part of drinking water use of households and institutions with rainwater, and through increasing rainwater infiltration to urban collectors and, enhancing the replenishment of the soil water and groundwater. Keeping rainwater is also important for improving the urban climate through establishing rain gardens or urban lake systems. By setting up rain water management systems that facilitate infiltration and the establishment of green infrastructure the first 20 mm of rainfall must be locally kept and used for replenishing groundwater and soil moisture.

Adaptation of settlements to climate change is past the phase of recognition. The means for adaptation are the reconsideration and integrated, climate-friendly and energy-aware planning of settlement structures and the operative actions. In the context of climate awareness, a priority task of settlements is to increase the size of green areas per capita to meet recreation demands. This needs an efficient supervision of the system of non-municipal green areas too. So far, we lack rules on the system of planning, licensing, technical inspection and contractor's technical inspection of green areas. We do not have comprehensive professional rules related to the planning of the green areas of settlement or a survey, registration and condition assessment of Hungarian green infrastructure and the foundations of green infrastructure development.

During the planning of green infrastructure, more attention should be paid to ecological and human health aspects in the selection of vegetation in addition to their utilization and aesthetics. Allergenic species should be avoided and as much as possible. Indigenous species and varieties adapted to the local conditions should be preferred.

Half of urban lighting is emitted uselessly towards the sky without providing useful illumination. A major part of electric energy (and energy sources) used could be saved. This would cut in half artificial sky glow through the optimum implementation of public, decorative and outdoor lighting because light pollution can be considerably decrease without spoiling the purpose of lighting. Measurements made before and after lighting modernization projects aiming at energy efficiency show that the geometrics of lighting have indeed improved but the city glow was not reduced (Kolláth).

Production function

The combination of semi-natural areas and landscapes established through management with important natural assets, and landscapes having old cultural traditions has created a very unique landscape character which is typical almost only of Hungary and can be preserved almost only in Hungary.

Farming methods and the knowledge of traditional farming methods are available to preserve the type, the natural condition and the level of biodiversity of landscapes over the long-term. Nevertheless, we are not managing rain water and inland excess water satisfactorily because the water management structures were constructed to facilitate their rapid drainage. Extreme weather events (adverse changes in frequency and intensity) pose a tough challenge to water management. The establishment of the optimum water management is crucial for the sustainability of landscapes. Hungary is exposed to floods, inland excess water and droughts alike. A key means of risk management is managing landscapes using "best practices."

Proper forest management and agriculture, as well as sustainable and water management of settlements is important for local water management, flood and excess water protection and river and lake regulation. Taking landscape configuration into account contributes substantially to the reduction of the risk of flood and excess water, as well as drying which helps important environmental, economic and social interests to prevail. Environmental, economic and social interests must be integrated and there is a need for complex actions coordinated in river basins. We must exploit the synergies inherent in different policies, in the fields of flood protection, landscape management, water management and water retention. For instance, forest management should pay attention to keeping and preserving soil because that helps in reducing the riverbank and soil erosion caused by floods and in increasing the retention of waters. Different activities should be integrated to achieve the optimum solution. It is important know what effects our activities related to land use exert on the water balance of a given area or river basin.

Green infrastructure development has a favourable influence on the condition of waters, more ecosystem services are provided. The maintenance of ecosystems is an important means of the adaptation to climate change.

Agriculture

In the past 25 years, the size of agricultural areas decreased by approximately 1.2 million ha. Despite of the shrinking size of its production areas, Hungary is among the leaders in terms of the size/proportion of agricultural lands in Europe. Crop cultivation is the dominant sector of Hungarian agriculture. On the majority of our arable lands (2.6 million ha) grains, chiefly wheat (3.7 million tons in 2010, 5.2 million tons in 2014), corn (7 million tons in 2010 and 9.3 million tons in 2014) and sunflower (502,000 ha, 970,000 tons) are produced (KSH). Diversification is low in large-scale farming. Nearly 90% of small farms are engaged in the production of a maximum of three types of crops and nearly half of them cultivate only one. The diversification average of farms of less than 10 ha is 2, that of the farms larger than 200 ha is 6.6 crops, while the average is 2.5 which indicates that the diversification of farms of 10-200 ha is also rather low (NRDS).

Production has shifted towards large-scale crops and mass production, independently of the structure of plants. The world demand and supply of agricultural products substantially

determines crops preferred by Hungarian farmers. Therefore larger crops alternate which is represented as "industrial type" of production in Hungarian landscapes on both small and large-scale farming areas. The typical Hungarian landscape management heritage, **the traditional land use** (e.g. grazing, wine growing, fruit and vegetable production, homestead farming) is **shrinking** and **as a result, landscape is losing its patchwork pattern on an increasing area**. Hungary still has a number of landraces that are adapted to local environmental conditions, which can be cultivated in an environment-friendly way and that can also be used in organic farming. Their preservation and registration is ensured through Hungarian gene banks. With the new demands emerging in consumer markets (instead of mass-produced items, quality food), the demand and supply of varieties associated with different landscapes is also becoming more apparent. **Landscape-specific farming** and the **development of short food chains ensure healthier food** and can also **open new opportunities for launching products of increased value**[12].

Nearly 10-15% of the 4.3 million hectares of the arable lands is often flooded. The increase in flooding is partly caused by the degradation of soil structure due to inadequate soil cultivation and the lack of deep ploughing and subsoil loosening (e.g. plough sole) for decades and the lack of permanent crops. Solutions to flooding include:

- improving soil structure (deep ploughing/deep loosening), planting permanent crops that do not require ploughing or
- regular deep ploughing only when soil is wet by using varying depth cultivation.

Correct local water management is adapted to landscape configurations and facilitates the implementation of responsible landscape management relying on landscape configurations. On fertile areas, agricultural cultivation must be facilitated through selecting the right crop ratio and the cultivation method that best fits the landscape. Support must be provided for the selection of the correct utilization methods (classifying low lying lands and lands prone to flooding) to ensure safety and crop yields. Properly designed water regulation may increase the proportion of protected areas that are suitable for cultivation.

The condition of habitats on agricultural areas and sustainable agricultural practices are declining. The population of bird species linked to agricultural habitats is approximately 70% compared to 1999 as base year (KSH).

Overuse due to economic interests that do not take into account the load bearing capacity of landscapes is high. According to the NRDS, **a change of land use and land use intensity would be required on nearly 25% of the agricultural areas**. The change of land use and land use intensity can also be justified by topography, soil fertility, climate conditions and the exposure of the area. A general change of land use and land use intensity is recommended based on the evaluation of slopes exposed to erosion, low fertility soil, areas exposed to water, and frost hollows. Comprehensive professional justification can be facilitated by updating information on soil characteristics and the maps and databases showing their changes. It is also important to update the agronomic data affecting soil fertility and related to soil structure and the changes in soil structure.

The legal regulations on agricultural production are quite often not in accordance with the landscape protection goals whose achievement is also influenced by ownership relations and

[12] The current output value of Hungary is 1500 EUR/ha which is very low compared to other EU countries.

economic incentives. When influencing land uses, it is important to bring to the front positive economic incentives that take load bearing capacity into account instead of restrictions.

The animal population has significantly decreased and shows a strong concentration in Hungary. The coupled supports from EU funds, introduced in 2015 and the supplementary and provisional state subsidies slightly improved the shifted ratios. There was a particular drop in grazing livestock, livestock farming separated from land use and crop production. There is a need to further study the use of opportunities inherent in natural and human resources in livestock farming.

Forest management

The increase of the standing tree stock of Hungarian forests has continued in the past 10 years and by now it exceeds gross 360 million m^3. The national average annual increase is 6.5 m^3 per hectare. The reasons for the positive change are the permanent expansion of forest areas and the increase of felling in protected forests and lower exploitation of harvesting potentials. By the end of 2014, forest coverage reached 20.8% or 1,939,263 ha. Currently 2,059,678 ha. are used for forest management in the country. The vast majority of forests (89%) is composed of broadleaved tree species including Robinia (24%), oak (21%) and turkey oak covering 11% of the areas. Only 63% of our forests are native and 37% of our forests are composed of alien tree species or bred varieties. To implement sustainable forest management we need to improve the state of naturalness of forests and to plant species adapted to the landscape (adequate to the place of production) (Forestry Strategy).

Forests play a crucial role in mitigating the effects of climate change. The establishment of **mixed forests** and the development of tree species or reproductive materials that are **the best to ensure the survival of the forest under the changing climatic conditions** are important and promote biodiversity. Furthermore, under the current climate change tendencies, the quantity of forest damage may considerably increase and new types of forest damage caused by non-indigenous and invasive insect species can occur. The natural carrying capacity must also be taken into account in managing game.

Mining

In the past years, there was a change in the perception of the mineral resources supply of the country. The increasing utilization of our exploitable geothermal potential, stock of coal and lignite resources (assuming that a suitable exploitation technology is in place) and our non-conventional hydrocarbon reserves can significantly increase Hungary's security of supply and substantially decrease our dependency on imports in the long run. Moreover, non-ferrous and precious metal resources, rare earth metals, aggregates and other non-metallic minerals that can be extracted in an economically viable manner have a considerable potential for our national economy. It can also support the economic revival of disadvantaged old industrial or mining communities through creating jobs. The economic potential of raw material deposits has a long-term strategic importance. Therefore when specifying the change in land use, the maintenance of the opportunity for extracting raw materials must also be considered in addition to nature, environment and landscape character protection.

Currently the Hungarian lignite and coal-fired power plants provide roughly 17% of the electric energy production of the country. Through a greater utilization of coal and lignite resources our dependency on imports could be decreased. The utilization of **clean coal**

technologies for energy generation and the carbon chemistry technologies are currently being researched and developed in Hungary. Through their development we will be able to use the coal deposits and to still satisfy stricter environmental requirements.

Thanks to the technological development in the field of hydrocarbon exploration and production, we gain information on the existence of and access to more resources. The intensification of **geothermal energy** recovery is justified by both economic policy and environmental protection. The traditional deep geothermal energy (mainly linked to thermal water production) and shallow geothermal energy (that can typically be utilized with heat pumps) have a promising potential in Hungary. A comprehensive assessment of critical materials listed by the European Commission (e.g. rare earth metals, coking coal, gallium, indium, germanium, fluorite, etc.) started in Hungary just a couple of years ago, so only limited information is available about their natural occurrence. Industrial wastes (e.g. red sludge and ash) generated through coal and bauxite extraction and utilization can be considered as potential secondary raw material deposits. Critical materials can be extracted by relatively simple technologies, which would partially eliminate waste deposits.

Hungary has numerous deposits of non-ferrous and precious metal ores, bauxite, as well as manganese and uranium ores. In the majority of these areas underground mining or open-pit mining was done earlier. In many cases, these deposits still have economically significant resources. These are mainly located in mountain areas that have outstanding landscape configuration or are on valuable tourist areas (e.g. Mátra, Börzsöny, Tokaji-hegység, Bakony, Velencei-hegység, Mecsek, and the surroundings of Aggtelek-Rudabánya).

Aggregate mining means the extraction of hard rock, sand, gravel used primarily by the construction industry. Since aggregates are available on more areas than other raw materials, and are typically extracted by open-pit mining, their extraction has a considerable impact on the landscape. Nevertheless, it is important to note that the majority of stocks explored resources so far is not available due to different legal regulations (nature, landscape, water resource, forest, cultural heritage, etc.). The extraction of aggregates is of strategic importance for infrastructure investments and the construction industry. Therefore priority management of the still available known resources is very important.

There is limited geographical availability of the raw materials for cement, brick and tile industries (clay, chamotte earths, clay minerals, marl, gypsum), quartz sand deposits and silicate minerals important in environmental technology (zeolite, bentonite), diatomite and alginite. These are also typically extracted by open-pit mining, so their extraction can also have a significant impact on the landscape, (e.g. Tokaj mountains, Villány mountains, Bakony, Kemeneshát).

The success of recultivation following mining greatly depends on the proper selection the subsequent utilization and how the new usage fits the landscape structure. For landscape protection-based planning, it is important to take into account the geological values and the values of the newly developed environment that can further enrich the landscape after the mine is closed. Nevertheless, mining must be treated very cautiously and wisely on World Heritage sites and areas.

It should also be noted that the professional and financing guarantees of subsequent utilization after mining have developed in the past decades. They can serve as best practices for other sectors after the termination of an activity, with special attention to the fact that neither plans nor financial sources are available for demolition or reconstruction of many buildings and facilities. The landscape protection guarantees after abandonment can be enforced if the **experts** who are **capable of evaluating landscape configurations and the planned land use**

are present not only during the planning but at all levels of the implementation and licensing processes and they have the means to enforce legal compliance.

Infrastructure and communication functions

Greenfield investments and the transport infrastructure impoverish the ecological structure of Hungarian landscapes. Although settlements are major ecological obstacles in Hungarian landscapes, the main roads and railroads contribute the most to the development of ecological closed areas. Transport infrastructure strongly fragments habitats which is one of the biggest threats to wildlife.

The ten most fragmented small regions of Hungary are Somogyi parti sík, Visegrádi-Dunakanyar, Budaörsi- és Budakeszi-medence, Balatoni-riviéra Vác-Pesti-Duna-völgy, Pécsi-síkság, Zagyva-völgy, Soproni-medence, Keszthelyi-riviéra, Tarna-völgy. The Alföld (Great Hungarian Plain) is slightly fragmented based on the parameters of both settlementsand roads/railroads, while Dunántúli-dombság (Transdanubian hills) is heavily fragmented (Csorba 2005.).

There has been a significant improvement in the field of infrastructures reducing environmental pressure, especially of waste and waste water treatment. Today ecological (game) passages are constructed both below and above the highways which, if planned and constructed properly, create a lifesaving bridge for certain species. These artificial connectors, the underpasses and animals' bridges are less efficient for other species.

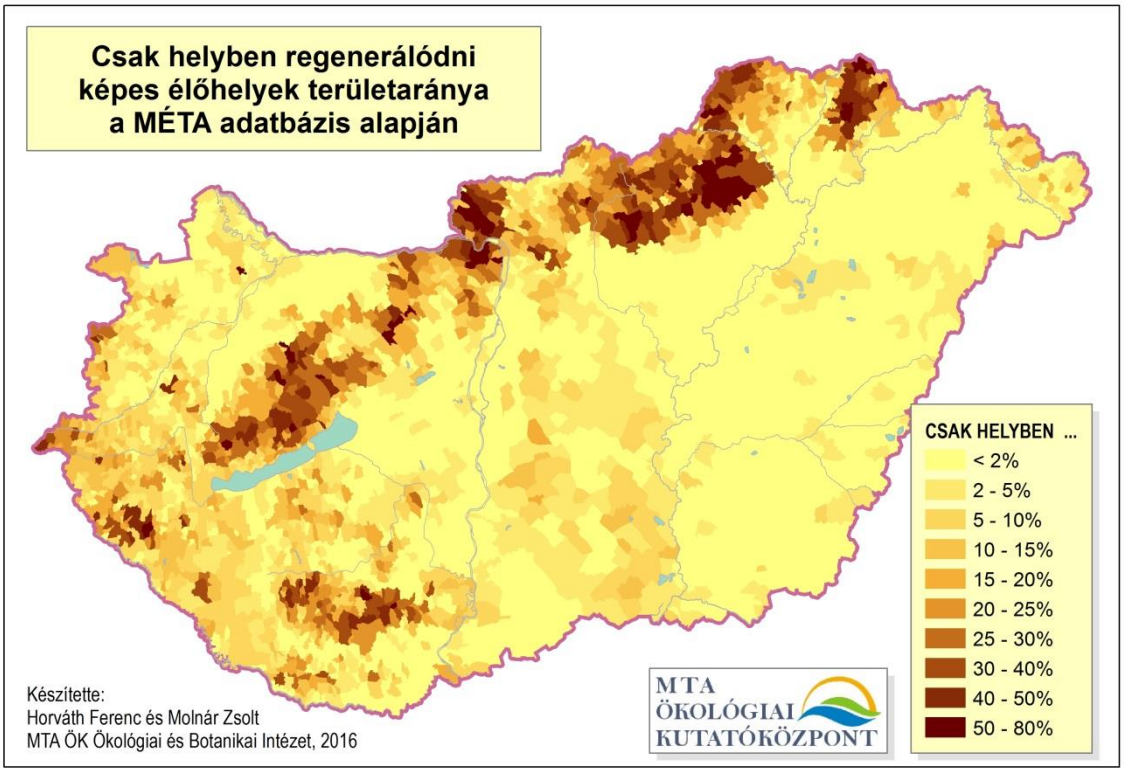


Figure 15 The rate of habitats than can only regenerate on the place of existing stands based on the MÉTA database (Centre for Ecological Research Institute of Ecology and Botany, Hungarian Academy of Sciences)

A key to road construction is the cooperation of road designers and the landscape-nature protection experts in finding the most environment-friendly track that can be fitted to the

landscape. The survival of a population is ensured if the local extinction and the recolonization process are balanced between the metapopulation habitats. At the same time, to protect biodiversity, we must also keep in mind that certain habitats are only able to regenerate locally. They cannot be saved by relocation, or replaced. Thus the loss of such habitats due to for example infrastructure expansion can be considered final.
Figure 15 shows the habitats that can only be regenerated locally by settlements. It is very important to make habitats that are only able to regenerate locally a "taboo" for infrastructure developments, but it also requires the modification of the official procedure and the provision of basic information.

Recreational function

On the supply side of the Hungarian tourism market, the natural and cultural heritage assets have a dominant role. The tourist attraction of Hungarian landscapes is primarily represented in its heterogeneity and diversity. For foreign tourists, the capital city and its environs, the thermal baths and Lake Balaton have an absolute attraction. National tourism is less characterized by geographical concentration. Valuable sources of tourist experience are the mountains and hills, the water bodies suitable for recreational activities, the thermal baths, the World Heritage sites[13], the national parks of outstanding value, other natural areas suitable for hunting, horse riding, fishing, the historical and cultural heritage sites including unique Hungarian gastronomy and wine making.

Out of the 27 recreational areas located in the different regions of Hungary, six are high priority recreation areas[14]. The majority of national parks have an important role in nature conservation are situated in high priority recreation areas. The national parks together with other nature reserves of national importance are becoming highly frequented ecotourism destinations. The number of registered visitors was more than one and a half million in 2015. Our ten national parks[15] affect the area of more than 400 settlements. In Hungary, more than 800 facilities of ecotourism are open to visitors interested in natural values. Among such visitors are the organised hikers who are represented by Magyar Természetjáró Szövetség (the Hungarian Hiker's Association) and its regional, county and local organizations with more than 12 thousand registered members (MTÜ).

Our villages lying in beautiful natural environments (on hills, mountains, around waters or in a region of homesteads on the plains) are excellent destinations for rural tourism. Increasing numbers of people are looking for this kind of recreation. In 2015 more than 400,000 tourism nights were spent in village accommodations in Hungary (MTÜ). By improving reception capacities, increasing the elements of supply, the positive effects of tourism in economic expansion and in keeping the population at home can be further increased. All these are primarily affected by national tourism.

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[13] World Heritage sites: Budapest, including the Banks of the Danube, the Buda Castle Quarter and Andrássy Avenue, Old Village of Hollókő and its Surroundings, the Caves of Aggtelek Karst and Slovak Karst, *the*Millenary Benedictine Abbey of Pannonhalma and its Natural Environment, Hortobágy National Park - the Puszta, Early Christian Necropolis of Pécs (Sopianae), Fertö / Neusiedlersee Cultural Landscape, Tokaj Wine Region Historic Cultural Landscape.

[14] Budapest and the Danube bend, Balaton, Mátra-Bükk, Sopron-Kőszeg-hegyalja, Lake Tisza, Lake Velence-Vértes.

[15] Balaton-felvidéki, Duna-Dráva, Fertő-Hanság, Őrség, Duna-Ipoly, Aggtelek, Bükki, Hortobágyi, Kiskunsági, Körös-Maros

In Hungary, one of the key products of improving supply is health tourism. Its importance stems from our favourable natural assets , the traditions, the baths, thermal and wellness hotels constructed in the course of significant infrastructure developments, the good national coverage and a good value for money (Kardos 2011.). A total of 25 communities[16] are qualified as health resorts in Hungary Based on the register of the Office of the Chief Medical Officer of the National Public Health and Medical Officer Services (ÁNTSZ OTH) as on 8 August, 2016.

Tourism requires a lot of space and most types of recreation have an impact on landscape formation. Some of the residential and agricultural buildings near tourist destinations were reconstructed for recreational purposes or as restaurants. The former small villages went through a significant transformation in parallel with the emergence of tourism. However, the utilization of recreational areas, city parks and other urban areas for recreational purposes in settlements that are not tourist centres was reduced.

[16] Miskolc-Lillafüred, Eger, Harkány, Sopron, Gyöngyös-Kékestető, Hévíz, Debrecen, Balatonfüred, Parád, Hajdúszoboszló, Zalakaros, Bükfürdő, Gyula, Sárvár – 2 helyszínnel, Mezőkövesd, Nyíregyháza – Sóstógyógyfürdő, Szigetvár, Tapolca, Kiskunmajsa, Kiskunhalas, Mórahalom, Lenti, Orosháza-Gyopárosfürdő, Nyírbátor, Tiszakécske

4.5 SWOT analysis

Strengths	**Weaknesses**
- The unique values of Hungary to be preserved and their international significance - International commitments - Landscape protection aspects incorporated in Hungarian legislation - Existing socio-economic effects supporting favourable change in landscape conditions - Availability of highly qualified professionals	- Unfavourable changes in landscape - Growing distance between landscape and society, lack of landscape identity - Lack of landscape monitoring, lack of efficient professional means to study the processes behind landscape changes - Weak laws, public administration and economy to block unfavourable processes
Opportunities	**Threats**
- Adjustment of the public administration and legal system, inter-sectoral interpretation of landscape - Improvement of the professional skills - Modification of land uses with awareness of landscape - Expansion strengthening of social participation - PR and communication - Opportunities for international cooperation	- Adverse social processes, alienation from landscape - Spontaneous landscape changes due to negative environmental factors - An economy relying on landscape assets and threatening sustainable land use

5 Vision

The vision is dual: it outlines the future condition of Hungarian landscapes and the vision of Hungarian landscape policy.

5.1 Vision of Hungarian landscapes

The vision of Hungarian landscapes is supported by five principal pillars:

- Utilization of the environmental elements typical of the landscape is sustainable and integrated.
- Valuable traditional land uses are sustained. Degraded sites are recovered.
- Semi-natural and developed areas, as well as land use associated with production are characterised by diversity and richness.
- The proportion of built-up areas is low, does not increase or increases only to the extent of the actual demands; is linked to compact liveable settlements.
- The settlements and the heritage assets are harmoniously embedded in the landscape.

5.2 Vision of landscape policy

To ensure the pillars of Hungarian landscapes specified in the vision on a permanent basis, the following seven landscape policy pillars need to be achieved:

- The government handles landscape policy in a complex way.
- System-level management and monitoring of the processes that form the landscapes become the routine.
- Planning results in sustainable and balanced area uses.
- A general and differentiated protection of all landscapes of the country is implemented.
- The economic incentives are designed to promote landscape changes in a positive direction.
- Landscape potential is exploited without threatening landscape character and its values.
- The population has developed a strong landscape identity, efficiently cooperates issues connected to landscape

The vision drawn up by the NLS as a summary of the two visions:
Land use relies on landscape configuration and assets.

6 Policy objectives, areas of intervention and tools

6.1 The overall objective

The overall objective of the strategy is: **Responsible land use based on landscape configuration and assets.**
The landscape and its individual elements are used for suitable purposes and in suitable ways and only to the extent of sustainability. The approach of responsible land use is adopted by the whole society, by all decision-making levels from individuals to communities and from local decision-makers, authorities to the state. Response to challenges is sought through horizontal and vertical cooperation in order to find suitable areas for locating new functions required by society and to adjust the existing land uses to the landscape's potential based on the principle of sustainability.

6.2 Horizontal principles

To achieve the overall objective, adherence to the following horizontal principles must be ensured in the implementation of the strategy:

A) General protection of natural resources and cultural heritage
B) Wise and rational use of areas
C) The mitigation of the impacts of climate change and adaptation to it

6.3 Strategic objectives

To achieve the overall objectives, three headline targets are set by the strategy.

I. Laying the foundations for land use based on landscape configuration and assets
II. Liveable landscape – liveable settlement – wise land use
III. Enhancing landscape identity.

The system of sub-objectives linked to the headline targets are as follows:

I. Laying the foundations for land use based on landscape configuration and assets

Sub-objective I.1: Establishing the framework for land use based on landscape configuration and assets;

Sub-objective I.2: Monitoring changes in land use

Sub-objective I.3: Integrating land use based on landscape configuration and assets into decision-making

Sub-objective I.4: Integrating a complex approach to landscape into research activities

II. Liveable landscape – liveable settlement – wise land use

Sub-objective II.1: Compact, climate-friendly settlements that preserve values

Sub-objective II.2: Infrastructures fitted into the landscape

Sub-objective II.3: Production functions based on landscape configuration and assets

Sub-objective II.4: Recreational functions based on landscape configuration and assets

Sub-objective II.5: Better functioning regulatory and protective functions

III. Enhancing landscape identity.

Sub-objective III.1: Improving awareness and social responsibility

Sub-objective III.2: Improving social participation

Sub-objective III.3: Developing education and training related to landscape

The strategy covers the whole territory of Hungary. These measures typically affect or may potentially cover the whole country. The main promoter of the interventions is the government that provides for the completion of the measures through the government programme and the sectoral policies.

Sub-objective I.1: Establishing the framework for land use based on landscape configuration and assets

To achieve the overall objective, first t**he registries containing the spatial data of landscape configurations** and providing the planning system and the work of the authorities **must be developed through both site surveys and using automated methods**. This development includes the updating of the data content of the existing databases and the creation of the missing spatial data structures.

Hungarian landscapes are identified based on the survey of landscape configurations. A methodology for typing Hungarian landscapes based on their landscape character must be developed and a complex digital database of national landscape character areas must be set up. The methodology for regional and local delineation of landscape character areas and a complex digital database of regional and local landscape character areas must be set up. **Quality objectives and management principles must be specified for the national landscape character areas, regional landscape character areas and local landscape character areas.**

The professional foundations of the cultural heritage protection category "historical landscape" create an opportunity for the **delineation of new historical landscapes**.

The **compact settlement model** and the **climate-friendly settlement model** must be further developed and made **easily understandable**. A **methodology for landscape-scale heritage protection** must be developed and a **hierarchic system of landscape plans** must be devised.

Actions required to achieve the objective:[17]	***G***	***L***	***C***	***U***
1. ***The improvement of the data, spatial data of registries containing landscape configurations:***				
Improvement of the soil register (soil maps and databases), with special attention to the factors typical of the soil use and the configurations of the production area, e.g. updating agronomic data on soil structure that influence soil fertility.	✓			✓
The survey of habitats, updating (naturalness maps) and improving the MÉTA database (delineation of permanent grasslands in accordance with their management needs, delineations in accordance with regeneration potential).	✓			✓
Doing a survey and condition assessment of ecosystems.	✓			✓
Doing a survey and condition assessment of green infrastructure.	✓			✓
Drawing up a register of green surfaces.	✓	✓	✓	✓
Drawing up a register of landraces.	✓	✓	✓	✓

[17] *G: Government, L: Local government, C: Civil society organisations, U: Universities, research institutions*

Improving the register of fruit production areas (among others digitizing the maps of the register).	✓			✓
Improving the register of wine growing areas (among others updating data sources on which production area qualifications rely).	✓			✓
Drawing up a register of brownfield areas.	✓	✓		✓
Drawing up a register of rust belt areas.	✓	✓		✓
Condition assessment of abandoned mines formerly included under the "KAC", assessment and evaluation of the necessity for intervention.	✓			✓
Doing a survey and condition assessment of areas affected by melioration.	✓			✓
Doing a survey, re-assessment of agro-ecological potential.	✓			✓
Doing a survey of landscape fragmentation.	✓			✓
National assessment of light pollution (e.g. through the determination of sky luminance distribution) and condition assessment of light pollution.	✓			✓
Drawing up a register of historical landscapes and landscape parts.	✓			✓
Methodology and structural developments				
Identifying and eliminating the problems of landscape-related registration systems related to financing, access, data upload, data maintenance, system maintenance and compatibility.	✓			
Developing a uniform set of aspects and instruments for the evaluation and management of the different types of landscape characters.	✓			✓
Identification, condition assessment and the specification of the key features of national, regional and local landscape character areas.	✓	✓		✓
Description of landscape management and use practices facilitating or threatening the preservation of landscape character types, landscape character areas classified as valuable.	✓			✓
Developing guidelines and setting quality objectives related to brownfields, green surfaces, abandoned structures and (residential or recreational) areas with a high probability of being flooded included in the national registers.	✓			✓
Development and improvement of the compact settlement model.	✓	✓		✓
Improvement of the climate-friendly settlement model.	✓	✓		✓
Development and improvement of the methodology of landscape-scale heritage protection.	✓			✓
Development of the system of plans for landscape planning, the protection of landscapes, land use, set up from a series of different-level hierarchic landscape plans.	✓		✓	✓

Sub-objective I.2: Monitoring changes in land use

Changes in land use and changes in landscape character must be monitored. **The potential institutional background and the potential software and hardware for monitoring the process of changes in landscape must be** assessed and **compared**. After the selection of the best positioned and most cost efficient institution, a set of instruments for monitoring the process of changes in landscape must be developed and improved.

Actions required to achieve the objective:	*G*	*L*	*C*	*U*
Auditing the potential institutions for monitoring the changes in land use and landscape character: assessment of compliance.	✓			
Auditing the set of instruments for the monitoring of the changes in land use and landscape character (software, hardware, etc.)	✓			
Decision of the government about the appointment or establishment of the institution monitoring the changes in land use and landscape character.	✓			
Making the human resources and set of instruments of the institution appointed to monitor changes in land use and landscape character and their improvement.	✓			
Specifying the indicators and the base year of changes in landscape character and land use.	✓			✓

Sub-objective I.3: Integrating land use based on landscape configuration and assets into decision-making

The political and official decision and planning systems related to the landscapes should use the documents generated during the implementation of sub-objective I.1. **Land use based on landscape configuration and assets** should be represented as a principle in **strategic and planning documents and in the legal regulations**.
The **support schemes** and **economic incentives** should take the landscape configuration and assets into account as much as possible. Calls for proposals related to activities significantly modifying land cover should take into account the principle of land use based on landscape configuration and assets as much as possible, if this option is included in the EU programme and it does not represent unreasonable costs for the farmers.
The **ministries** and the **sectors** should reinforce common reflection and cooperation during the **modelling and the complex management of the processes** provoking changes in landscape.

Actions required to achieve the objective:	*G*	*L*	*C*	*U*
Integrating the requirements for land use based on landscape configuration and assets into future strategic and planning.	✓			
Integrating the principle of land use relying on landscape configuration and assets into the legal regulations of the sector.	✓			
Consolidating the terminology of legal regulations.	✓			
Development the legal regulation stipulating the requirement of the compact settlement model and the development of economic incentives for the delineation of areas to be built up and for acquiring the permit for greenfield investments.	✓			

Clarification and legal regulation of state and municipal responsibilities related to green surfaces.	✓			
Developing comprehensive regulations for the system of planning, licensing, technical inspection and contractor's technical inspection of green surfaces in incorporated areas.	✓			
Developing a comprehensive professional regulatory framework applicable to the planning of the green surface system of settlements (e.g. size of green surface per capita, maximization of the distance of accessing green areas from residential areas, minimum area required for local rainwater utilization).	✓			
Development of a methodological guidance to support the preservation of landscape character types, landscape character areas classified as valuable.	✓			
Developing, improving the set of decision support instruments (e.g. checking the implementation of TDR - Spatial Decision Support Systems, TTTT-IR - indicator maps supporting territorial planning).	✓			✓
Supporting decisions of authorities based on landscape configuration and assets through the creation of support tools, the utilization of registers listed under sub-objective I.1. and by registering all legal matters. [18].	✓			
Drafting a National Basic Plan for Landscape: A long term plan based on consensus and bound to GIS indications on maps.	✓			
Supporting joint planning, cooperation and a complex approach for landscapes stretching over administrative borders.	✓			
Harmonizing economic incentives.	✓			
Integrating the requirements for land use relying on landscape configuration and assets into the support scheme as much as possible.	✓			
Integrating the (landscape potential-based) quality objectives related to landscapes into the incentive schemes as much as possible.	✓			

Sub-objective I.4: Integrating a complex approach to landscape into research activities

Research should include the potential changes in the landscape, as well as the impacts exerted on landscape structure, landscape character and on the material and energy processes of the landscape in the sectoral studies. Complex landscape studies should be launched.

Actions required to achieve the objective:	***G***	***L***	***C***	***U***
Complex landscape studies.	✓		✓	✓
Research into the internal operational features of the landscape structures focusing on material and energy processes.	✓		✓	✓
Potential changes in the landscape should be studied by sectoral research.	✓		✓	✓
Laying the foundations for knowledge transfer through research.	✓		✓	✓

[18] Legal natures laid down in Section 39A of Decree 109/1999 (29 December) FVM.

Sub-objective II.1: Compact, climate-friendly settlements that preserve values

The typical spatial structure of traditionally **clearly separated built and unbuilt areas** in Hungary must be preserved as favourable landscape character and as a key to the sustainability of settlements. The wise and rational use of areas, especially arable lands, the mitigation of the adverse effects of urban climate and the adaptation to the climate must be achieved with an integrated approach.
Structures in settlements must be revised to be climate friendly with the goals of planning wise and rational area use. New functions must be given to abandoned areas and the climate-friendly settlement model must be implemented. We need the energy reconstruction of buildings, urban planning, green surface planning, and we need brownfield and rust belt refurbishment. These interventions must be related to adaptation to climate. Landscape elements must be taken into account for the selection of the location of industrial facilities which must be fitted into the environment. The reconstruction of cultural heritage elements and public institutions must be done in accordance with their position in the landscape and in connection with their surroundings through integrated planning. Fitting residential and recreational buildings into the landscape must be enhanced in a way to add to the visual culture of the population. The needs and perceptions of the local population must be taken into account in forming the landscape character of settlements. It is important that settlements could create their own image through the aesthetic harmonization of traditions and new functions and, at the same time, this objective also contributes to increasing landscape identity.
For the energy modernisation of settlements, reducing light pollution is also an objective. The glow of settlements must be reduced through intelligent lighting and the use of spectral compositions less harmful to biological systems and human health.

Actions required to achieve the objective:	***G***	***L***	***C***	***U***
Reconstruction of cultural heritage (e.g. places, castles, castle ruins) in accordance with their position in the landscape and through integrated planning.	✓	✓		
Reconstruction of public institutions in accordance with their position in the landscape and through integrated planning.	✓	✓		
Implementation of the methods of landscape-scale heritage protection and their integration into the planning systems.	✓	✓		
Implementation of the climate-friendly settlement model, planning and interventions on settlement structure level.		✓		
Improving rainwater infiltration and enhancing the replenishment of the soil water content and groundwater and keeping rainwater in the settlements through increasing the size of green surfaces and the establishment of urban lake systems to improve urban climates.		✓		
Setting quality objectives related to the green surface system of each settlement.		✓		
Setting quality objectives related to areas having a probability of 1-5% of being flooded (flood, excess water).		✓		
Setting quality objectives related to brownfield areas and rust belt areas on each settlement.		✓		
Drawing up a register of abandoned buildings in each settlement, their suitability assessment and identification of new functions.		✓		

Designing and installing light pollution-free public lighting in settlements: improving the geometry of lighting, using a lower colour temperature than 2700K.		✓		
Specifying quality objectives and management principles for local (settlement) landscape character areas.		✓		
Integrating the quality objectives related to brownfields, rust belt areas, abandoned buildings, green surfaces and areas exposed to the risk of flood/excess water into the regional and local development plans and land use plans and urban development plans.		✓		
The fitting of residential and recreational buildings into the landscape must be facilitated through using attitude shaping tools of visual culture.		✓		

Sub-objective II.2: Infrastructures fitted into the landscape

The quantity of infrastructure in the landscape was formerly determined by development decisions. Therefore, the first alternative for fitting infrastructure into the landscape, following the principle of cost saving and prevention, is to use the existing elements. New infrastructure must be planned and designed by using the wise area utilization model and in a way to avoid increasing landscape and ecological fragmentation. The surveys and registers related to the implementation of sub-objective I.1. and the decision support tools facilitating the implementation of sub-objective I.2. must be used.

Using existing elements or areas occupied by existing elements, if a need for infrastructure arises.	✓	✓		
Taking into account the fragmentation and resilience of ecosystems in the decision-making mechanism, avoiding ecosystems that are only able to regenerate locally.	✓	✓		

Sub-objective II.3: Production functions based on landscape configuration and assets

Agriculture and forest management must be adjusted to the local configurations and assets, while taking into account the requirements of the safety and security of national food supply and sustainability.
Adapting to climate change, agriculture will need diverse cultivars. Forest management should have a patchwork system. Agriculture and forest management do not only adapt to climate change but they also have a key role in influencing climate. Therefore the goal in agriculture and forest management is to maintain areas permanently covered with plants in order to improve the balance of water and heat. Creating a patchwork landscape for producing healthier food and products of increased value. In production areas, consensus based rehabilitation interventions, on certain areas changes in land use or change of intensity are necessary for the adjustment to landscape configuration and assets. For responsible, resource-efficient mining activities, the utilization of the sources of secondary raw materials must be increased and the demand for raw materials must lowered. Nevertheless, the accessibility of the sources of raw materials must be taken into account for planning land use.

Actions required to achieve the objective:	***G***	***L***	***C***	***U***
Delineating areas suitable for preserving the typical Hungarian landscape management heritage and the traditional land use.	✓			

Revising the land use of agricultural areas and setting consensus-based quality objectives.	✓			
Revising the land use of forest management areas and setting consensus-based quality objectives.	✓			
Setting consensus-based quality objectives for the mining fields and the landscape after mines are abandoned.	✓			
Integrating the consensus-based quality objectives into the development plans and supporting schemes.	✓			
Planting crops and supporting the use of landraces appropriate to production areas.	✓		✓	
Encouraging agricultural practices that are based on agro-ecological potential.	✓		✓	
Promoting the diversification of agriculture.	✓		✓	

Sub-objective II.4: Recreational functions based on landscape configuration and assets

In addition to the economic potential, the primary tasks are the adaptation to the landscape configuration and assets and the **consideration of resilience** in planning the location, choice, intensity and seasonality of recreational uses.

Actions required to achieve the objective:	***G***	***L***	***C***	***U***
Assessing the resilience of recreational areas or areas identified for recreational activities.	✓			
Revising the land use of recreational areas and setting consensus-based quality objectives.	✓			
Interventions for the rehabilitation of overused recreational areas, change of intensity or function.	✓			

Sub-objective II.5: Enhancing regulatory and protective functions

The effects of climate change can be mitigated by regulating ecosystems and preserving semi-natural habitats. Deficiencies of mitigating efforts must be reduced by recovering the regulatory functions and increasing the size of biologically active surfaces. This can be achieved primarily through planting new forests, turfing and the creation of new green surfaces in settlements.
The use of areas having protective functions (designated areas and buffer zones must be revised. I Incompatible uses must be replaced with compatible uses based on consensus.

Actions required to achieve the objective:	***G***	***L***	***C***	***U***
Delineation of degraded ecosystems requiring recovery, specifying the intervention for recovery and recovery of the ecosystems.	✓			
Setting quality objectives for areas with regulation functions, but no protective functions.	✓			
Revising land use and suitability assessments of areas having protective functions (designated areas, and buffer zones.	✓			
Setting consensus-based quality objectives for the land use of areas with protective functions (for more efficient regulation.	✓			
Rehabilitation interventions based on consensus, changing the type and intensity of land use in areas with protective functions.	✓			

Sub-objective III.1: Improving awareness and social responsibility

Improving social responsibility necessary for the establishment and maintenance of responsible land use based on landscape configuration and assets. Targeted programmes must be launched for the state bodies, the civil society and especially for the members of the cyber generation, as future decision makers. Supporting favourable community initiatives and the implementation of best practices are very important. If knowledge and the best practices are more easily available, the sensitivity towards landscape issues increases and landscape knowledge broadens.

Actions required to achieve the objective:	*G*	*L*	*C*	*U*
Supporting favourable landscape-scale community initiatives (e.g. nature parks, geoparks) and the implementation of best practices.	✓			
Continuing with the Hungarian Landscape Award programme.	✓			
Improving the availability of and granting the wider public access to landscape-related databases.	✓			
Launching programmes for authorities and state bodies to increase sense of responsibility and sensitivity.	✓		✓	✓
Launching programmes for civil society, in particular the cyber generation to increase sense of responsibility and sensitivity.	✓		✓	✓
Documenting and integrating knowledge related to typical Hungarian landscape management heritage and traditional land use into education - especially certain trades that are directly related to land use but are disappearing.	✓		✓	✓

Sub-objective III.2: Improving social participation

Are any procedures where the opportunity for social participation is not ensured? Participation must be encouraged in administrative proceedings where social participation is the key to the implementation of long-term social interests.

Actions required to achieve the objective:	*G*	*L*	*C*	*U*
Auditing public participation procedures.	✓			
Encouraging the participation of citizens, local and regional authorities and other interested parties, e.g. involving the local institutions of higher education in the planning and strategic processes.	✓	✓		

Sub-objective III.3: Developing education and training related to landscape

Passing on landscape-related knowledge may not be restricted only to people adept in landscape matters but it should also cover, engineering courses and any other courses whose graduates will influence the condition and the use of landscapes through their future decisions. Training and education must be reinforced with information about landscape and with an approach that takes landscape into consideration. Therefore there is a need for auditing and modernizing training and education. Basic knowledge required for the implementation of land use based on the landscape configuration and assets must be integrated into public education and higher education in a generalist (and age-appropriate) way. Basic knowledge related to landscape must be integrated into lifelong learning

Actions required to achieve the objective:	***G***	***L***	***C***	***U***
In higher education, integrating the knowledge of landscape and a responsible attitude towards landscape into the professional competences to be learned under the basic studies on sustainable development.				✓
Auditing public education and updating landscape-related knowledge while updating the core curriculum.	✓			
Organizing conferences and multidisciplinary training programmes.	✓			
Continuing training of land users, increasing the training content with landscape-related knowledge.	✓			✓
Continuing education of consultants, inclusion of landscape-related curriculum in the continuing education system.	✓			✓

7 Financing interventions

A major part of actions for the fulfilment of the objectives is or can be linked to operational programmes financed from EU funds. At the end of the EU budgetary period and the beginning of period of planning the following budgetary period, particular attention should be paid that the objectives specified in the strategy are included among the planning criteria. Additionally, the NLS contains actions that do not require funds in the budget but can be achieved as part of the existing tasks through a change of approach or attitude.

Pursuant to an expectation of the Council of Europe, Hungary must draw up a landscape inventory through public participation and keep a record of the changes in landscapes. During the implementation of the task, the potential institutional resources and the instruments for monitoring the process of changes in landscape must be assessed and compared. After the selection of the best positioned and most cost efficient institution, the set of instruments for monitoring the process of changes in landscape must be developed and improved and funded. Following an audit of institutional suitability and the instruments, the NLS delegates the responsibility for appointing or establishing the institution in charge of monitoring the changes in land use and landscape character to the government.

Based on the NLS, it is necessary to check how and from which financial sources development funds can the support plans and economic incentives which take into account the landscape configuration and assets. The **ministries** and the **sectors** should increase cooperation during the **modelling and the complex management of the processes** provoking changes in landscape. The integration of the approach of land use based on landscape configuration and assets into the system of economic incentives does not only serve the purpose of landscape protection but it may also result in significant budget savings on national level through the harmonization of different land uses and their adaptation to the local conditions. The government is responsible for the implementation of this task through the appointment of an intersectoral body.

The implementation of the objective **Laying the foundations for land use based on landscape configuration and assets** is supported by the *Territorial and settlement Development Operational Programme* and the *operational programmes of individual sectors*. Many activities are financed from the Environment and Energy Efficiency Operational Programme (EEEOP) or from the Competitive Central Hungary Operational Programme (CCHOP); high priority national projects carried out under these funds complete many actions.
Some of the actions are linked or could be linked to the *Public Administration and Civil Service Development Operational Programme, Economic Development and Innovation Operational Programme (EDIOP) or the Hungarian Fisheries Operational Programme (MAHOP).*
It also contains actions that do not require specific funds from the budget.

Objectives can be reached through the contribution of:

- the strategic assessments underlying the long-term conservation and improvement of natural assets of community importance and for the achievement of the objectives of EU 2020 Biodiversity Strategy (EEEOP-CCHOP);
- E-land register (KÖFOP);
- Setting up the National Spatial Data Infrastructure (NSDI);

- Setting up the Agricultural Water Consumption Information and Monitoring Framework (VIZEK);
- Integrated public water utility database.

The following may contribute to the objective **Liveable landscape – liveable settlement – wise land use**:

- the strategic assessments underlying the long-term conservation and improvement of natural assets of community importance and for the achievement of the objectives of EU 2020 Biodiversity Strategy (EEEOP-CCHOP);
- improving the welfare functions of forest ecosystems offered free of charge (RDP);
- setting up the agroforestry systems (RDP);
- the Farm Development Programme (RDP);
- the Village Producer Programme - Cultivated Parcel Revitalization Programme (RDP);
- support to be provided for agricultural practices that are favourable to climate and environment (EAGF);
- the action plan for the development and maintenance
- of the green infrastructure network - ZIFFA (TSDOP);
- the rehabilitation of brownfield areas (TSDOP);
- setting up green cities (TSDOP);
- sustainable urban development (TSDOP);
- sustainable traffic development of settlements (TSDOP);
- rehabilitation of degraded urban areas of towns with the status of a county (TSDOP);
- the development of World Heritage sites (EDIOP);
- the aquaculture providing environmental protection services (MAHOP).

The objective **Enhancing landscape identity** contains actions that do not require specific funds from the budget. However, dedicated budgetary or financial confirmation provided to support the set of instruments used by educational institutions, interest organizations and the NGO sector can greatly contribute to the achievement of this goal.
Objectives can be reached through the contribution of:

- the Hungarian Landscape Award programme (FM-ME-NFM);
- the improvement of the cooperation between the capital and county government offices and the municipalities;
- the development of demonstration sites (TSDOP);
- the improvement of the quality and the content of the vocational training and adult training in the 21st century;
- the development of the content regulators and the pedagogical methodologies of public education;
- the developments for lifelong learning.

8 Follow-up

This chapter contains the measurable indicators following-up the implementation of the NLS against the individual objectives. Indicators suitable for the following-up of the achievement of objectives and sub-objectives were selected by taking into account the accessibility of the relevant data and the need for its production. (Note: the monitoring of landscape conditions is different from the following-up the objectives of NLS, even though some indicators may overlap.)

MILESTONE/INDICATOR	INDEX/TARGET VALUE
I LAYING THE FOUNDATIONS FOR LAND USE BASED ON LANDSCAPE CONFIGURATION AND ASSETS	
Sub-objective I.1: Establishing the framework for land use based on landscape configuration and assets;	
• Setting up or developing databases containing spatial data of landscape configurations • The methodology for categorising the landscapes in Hungary based on landscape character • (2020) Digital database of national landscape character areas (evaluation of landscape character areas and the description of key characteristics) • (2021) The methodology for the delineation of landscape character areas at the regional level and on the level of local development • (2021) Specifying quality objectives and management principles for national landscape character areas • (2021) Specifying quality objectives and management principles for regional landscape character areas. • The availability and implementation of a compact settlement model planning guide • The availability and implementation of a climate friendly settlement model planning guide • Methodology for landscape-scale heritage protection	• The number and the size of settlements where landscape character areas have been delineated at a local development level (the evaluation of landscape character areas and the description of key characteristics is completed).
Sub-objective I.2: Monitoring changes in land use	
• (2018) Assessing the alternatives for tools and institutions for the monitoring of land use • (2022) Has the monitoring of changes in landscape character been launched? • Report entitled Landscape Condition of Hungary (every 5 years)	
Sub-objective I.3: Integrating land use based on landscape configuration and assets into decision-making	
• Availability of a validated decision support system for strategic environmental assessments • Consolidation of the landscape evaluation methodology • Entering all legal matters into the land register • (2024) National Basic Plan for Land Use • Setting up an inter-ministerial body for monitoring the supporting plans	• The number of sectoral strategies that integrate the principle of land use relying on landscape configuration.
Sub-objective I.4: Integrating a complex approach to landscape into research activities	
	• Number or rate of landscape studies and complex studies

II. LIVEABLE LANDSCAPE – LIVEABLE SETTLEMENT – WISE LAND USE	
Sub-objective II.1: Compact, climate-friendly settlements that preserve values	
• Integrated planning of the renovation of cultural heritage elements	• Size of settlement area; target value: stagnation • Rate of new investments implemented on brownfield areas, rust belts or existing industrial plants (target value: 90%) • Biomass (leaf area) index based on satellite pictures (NDVI) • Number or proportion of settlements having a modern rainwater management system • Number of settlements having a public lighting system without light pollution
Sub-objective II.2: Infrastructures fitted into the landscape	
	• Landscape fragmentation
Sub-objective II.3: Production functions based on landscape configuration and assets	
	• Size of arable land on areas with a flood exposure probability of 1-5%. Target value: 0-5% • Ecosystem recovery on agricultural lands. Target value: 5% • Cultivated vineyards on areas included in the register of vine-growing areas • 63 percent of our forests are indigenous, Target value: min. 66% • Rate of landscaped mines compared to the rate of abandoned mines
Sub-objective II.4: Recreational functions based on landscape configuration and assets	
	• Rate of tourism nights compared to the population size (per settlement) • Size of settlement (“incorporated area/residential area) on areas with a flood exposure (flood, excess water) probability of 1-5%.
Sub-objective II.5: Better functioning regulatory and protective functions	
	• Ecosystem recovery on areas with limited regulatory functions. target value: min. 15%. • The rate of maintained areas with semi-natural habitats (by settlements)

III. ENHANCING LANDSCAPE IDENTITY	
Sub-objective III.1: Improving susceptibility and social responsibility	
	• The number of people enrolled in accredited landscape protection, heritage protection continuing training • The number of exhibition sites of the Landscape Award travelling exhibition • The number of civil society organizations willing to work for landscapes
Sub-objective III.2: Improving social participation	
• Has the audit of public participation procedures been carried out?	• The number of publicly available databases
Sub-objective III.3: Developing education and training related to landscape	
• Has the audit related to higher education been carried out? • Has the audit related to public education been carried out?	

9 List of abbreviations

AKG	agri-environmental management
BM	Ministry of Interior
CCHOP	Competitive Central Hungary Operational Programme
CCS	Climate Change Strategy
CDCPP	The Steering Committee for Culture, Heritage and Landscape
DUS	Distinctness, Uniformity, Stability
EAGF	European Agricultural Guarantee Fund
EAGF	European Agricultural Fund for Rural Development
EDIOP	Economic Development and Innovation Operational Programme
EEEOP	Environment and Energy Efficiency Operational Programme
EFA	Ecological Focus Area
ELC NCWG	European Landscape Convention National Co-ordination Working Group
EMMI	Ministry of Human Capacities
EU	European Union
ÉVM	Ministry of Building and Urban Development
FM	Ministry of Agriculture
FVM	Ministry of Agriculture and Rural Development
GAEC	Good Agricultural and Environmental Condition
GIS	Geographical Information System
HEBELC	Hungarian Expert Board of the European Landscape Convention
IUDS	Integrated Urban Development Strategy
JKP	Jenő Kvassay Plan
KAC	Environmental Fund Provision
KÖFOP	Public Administration and Civil Service Development Operational Programme
KSH	Hungarian Central Statistical Office
MAHOP	Hungarian Fisheries Operational Programme
ME	Prime Minister's Office
MÉTA	Landscape Ecological Vegetation Database
MFGI	Geological and Geophysical Institute of Hungary
MTÜ	Hungarian Tourism Agency
Nature Concervation Act	Act LXXIV of 1996 on nature conservation
NBS	National Biodiversity Strategy
NCI	Natural Capital Index
NDTC	National Development and Territorial Development Concept
NDVI	Normalized Difference Vegetation Index
NEN	National Ecological Network
NEP	National Environmental Programme
NFM	Ministry of National Development
NGM	Ministry for National Economy
NHRDP	New Hungary Rural Development Programme
NLS	National Landscape Strategy
NNCMP	National Nature Conservation Master Plan
NRDS	National Rural Development Strategy
NSDFS	National Sustainable Development Framework Strategy 2012-2014
NSDI	National Spatial Data Infrastructure
NSP	National Spatial Plan
OVF	General Directorate of Water Management
PR	Public Relations
RDP	Rural Development Programme
SDSS	Spatial Decision Support System
SKV	Strategic Environmental Assessment
SWOT	Strengths, Weaknesses, Opportunities, Threats
TÉKA	Register of Landscape Assets
TSDOP	Territorial and Settlement Development Operational Programme
TTTT-IR	Indicator maps supporting territorial planning
UNESCO	United Nations Educational, Scientific and Cultural Organization

UNESCO MAB	UNESCO's Man and the Biosphere Programme
VÁTI	Scientific Institution for Urban Construction
VIZEK	Agricultural Water Consumption Information and Monitoring Framework
VM	Ministry of Rural Development
ZIFFA	Action plan for the development and maintenance of the green infrastructure network

10 Definitions

The "**good state**" of surface waters and groundwater relies on the demands of human health, and on the demands of the ecosystems. The quality of waters used satisfies the requirements of the given type of use and the changes caused by human activities do not affect the functioning of natural habitats dependent on waters.

Natural resources: geological agent, raw minerals, surface waters and groundwater, soils, ecosystem.

Natural Capital Index - NCI = habitat quantity × habitat quality. Its goal is to present the distance of a complex landscape composed of different habitats from its initial natural state. Its version reshaped to the MÉTA system is the vegetation-based natural capital index.

Landscape is the area perceived by man. Its character is formed by the effects and interactions of natural factors and/or human activities.

Landscape type (landscape character): a pattern or system typical of a given part of landscape that was created through the joint effect of natural and anthropogenic landscape factors and that makes a landscape distinguishable from other parts of landscapes.

Landscape management means action, from a perspective of sustainable development, to ensure the regular maintenance of a landscape. Its goal is to guide and harmonise changes which are brought about by social, economic and environmental processes.

Landscape protection means actions to conserve and maintain the significant or characteristic features of a landscape, justified by its heritage value derived from its natural configuration and/or from human activity.

Landscape planning means strong forward-looking action to enhance, restore or create landscapes.

Landscape quality objective means, for a specific landscape, the formulation by the competent public authorities of the aspirations of the public with regard to the landscape features of their surroundings.

Green infrastructure is a spatial system within the context of the total administrative area; it is the network of natural and semi-natural aquatic and terrestrial ecosystems.

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Annex 1: Legislation with a focus on the protection-planning-management of landscapes:

Name of the legal regulation:	**link in terms of landscape**
The Fundamental Law of Hungary	The protection of the elements of landscape through the protection of resources and values.
Act CXI of 2007 on the Promulgation of the European Landscape Convention dated in Florence on 20 October 2000	Holistic approach to landscape; the ternary system of protection-planning and management
Act LXXIV of 1996 on the protection of nature	General landscape protection, landscape protection of protected nature reserve: the protection of the natural and semi-natural state of landscapes, the natural values underlying the aesthetic configuration and type of landscapes, nature systems and individual landscape assets.
Act LXIV of 2001 on the protection of cultural heritage	Landscape-scale protection of monuments and archaeological sites (e.g. historical landscape as a unique subject of monument protection, a single monument or a monument complex is a characteristic feature of the landscape), as well as the protection of historical gardens, cemeteries and areas having the significance of monuments (historical centres of settlements) as unique objects of monument protection.
Act LIII of 1995 on the general rules of environmental protection	The protection of earth, air, water, wildlife and built (artificial) environment created by man and its components individually or as an ensemble taking into account their interrelations.
Act LXXVIII of 1997 on the formation and protection of the built environment	Integration of the aspect of landscape protection; coordinated interests of forming the landscape structure and landscape image, with special attention to water, air, soil, climate and the wildlife protection; regulatory framework of the protection of local interests.
Act LXXVII of 2011 on World Heritage	The management and development of Hungarian World Heritage sites in harmony with the principles of sustainable development; unique view of original values/uniform image embedded into a historical environment (day and night-time view), preservation of spatial connections and ratios.
Act CX of 2012 on the Promulgation of the Council of Europe Framework Convention on the Value of Cultural Heritage for Society accepted in Faro	Landscape diversity.
Act XXI of 1996 on regional development and land use planning	General objectives and tasks related to regional planning: facilitating the harmonious development of the spatial structure, system of settlements of the country; decreasing the significant differences between cities and rural areas; maintaining a dynamic balance between the economy and the environment. The specific tasks of regional planning include the assessment of environmental configurations, area utilisation in accordance with the resilience of the environment, determining the location of infrastructural networks in coordination with the sectoral concepts.
Act XXVI of 2003 on the national spatial plan	Specifies the conditions for area use in the different regions of the country, the coordinated spatial location of technical infrastructure networks taking into account sustainable development, the preservation of area, landscape, nature, ecological and cultural configurations and values a the protection of resources. Accordingly, it specifies the transport and energy networks of national importance, the individual structures and the national zones.
Act CXII of 2000 on the adoption of the land use plan of the outstanding resort area of Lake Balaton and on the establishment of the land use planning regulation on Lake Balaton	It determines the system of the settlements that belong to the outstanding resort area of Lake Balaton and the spatial order of regional area use and the technical infrastructure network, as well as the regional zones where the unique land use rules must be applied.
Act XXI of 2005 on regional	It determines the system of the settlements that belong to the conurbation of

development plan of the conurbation of Budapest	Budapest and the spatial order of regional area use and the technical infrastructure network, as well as the regional zones where the unique land use rules must be applied.
Act XXXVII of 2009 on forests, on forest protection and forest management	Through regulating the relationship between forests and society and through specifying the conditions for a sustainable forest management, it ensures the survival, protection and enrichment of the forest as a community dependent upon natural factors and affected by human activities as well as the spreading of its effects to nature, society and the economy and through this it contributes to the maintenance of human life and to the improvement of its quality and security.
Act CXXIX of 2007 on the protection of arable lands	Determines the provisions on the utilization of arable lands, land protection, land classification and soil protection.
Act LXXIV of 2016 on townscape protection	Preservation and establishment of the typical and valuable image of Hungarian settlements and uniform protection of the built and natural environment.
Act XLVIII of 1993 on mining	Recovering areas changed as a result of mining of geological research activities in accordance with the technical operating plans taking into account among others water management, environment, nature and landscape protection requirements.