Interreg
Danube Region

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DANUBE WOOD(s)ROUTE

Regional Action Plan of Hungary Activity 1.3

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1.1. General information of the Partner

PROJECT	Danube Wood(s) Route
PARTNER ORGANISATION CONCERNED	STRIA
COUNTRY	Hungary
NUTS2 REGION	Southern Transdanubia
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1.2. Overall and specific objectives of the Action Plan

The *Danube Wood(s) Cultural Route Regional Action Plan of Hungary (RAP)* is a critical component of the broader Danube Wood(s) project, aligning with the strategic framework established by the Danube Wood Cultural Route Strategy. The overarching goal of the project is to ensure the sustainable use of the Danube region's forest resources while integrating wood-related cultural heritage into ecotourism. The RAP translates the common transnational strategy into concrete actions tailored to the specific needs of the Hungarian region.

The Regional analysis in the Hungarian RAP was carried out focusing on South Transdanubian Region, identifying practical measures for protecting and sustainably utilising natural resources. Actionable measures in the RAP not only address ecological and economic concerns but also strengthen social cohesion and regional development.

A key objective of the RAP is to facilitate agreement among regional stakeholders on specific measures that will advance the broader goals of the Danube Wood(s) Route project. This includes collective ideas in relation to locations that hold cultural and natural significance, enhancing their visibility, and integrating them into structured, sustainable tourism. By doing so, the RAP contributes to the project's primary objective of protecting and improving the sustainable use of the region's forest resources.

The strategic framework of RAP is rooted in the Danube Wood(s) Cultural Route Strategy, supporting the development of sustainable tourism infrastructure and services, including eco-lodges, cultural heritage centres, and thematic trails. These elements not only highlight the rich wood-related cultural heritage of the region but also foster economic opportunities for local communities through eco-tourism and wood-based industries. In addition, the RAP promotes conservation efforts, such as the protection of historical wooden structures and biodiversity conservation initiatives, ensuring that the environmental integrity of forest ecosystems is maintained.

The RAP also plays a crucial role in empowering local and regional actors by facilitating capacity-building initiatives. These include training workshops, knowledge-sharing networks, and stakeholder collaboration to strengthen the operational capacity of the Danube Wood(s) cultural route. By enabling actors at the regional level to actively participate in the development and management of

the route, the RAP ensures that the project is implemented in a way that reflects local priorities and needs.

Innovation and sustainability objectives of the Danube Wood Cultural Route are embraced in the RAP by promoting responsible forest management practices, sustainable forestry certification, and entrepreneurship in wood-based industries. Encouraging the development of eco-friendly furniture, bio-based materials, and traditional crafts not only diversifies economic opportunities but also reinforces sustainable use of natural resources.

Education and public awareness are also central to the RAP's implementation. By integrating wood heritage and sustainable forestry education into school curriculums and vocational training, the RAP ensures that future generations recognize the importance of preserving forest-related cultural assets. Community workshops, public awareness campaigns, and digital platforms further enhance engagement, fostering a deeper appreciation for the cultural and ecological value of the Danube region's forests.

Overall, the Regional Action Plan is a vital tool for translating the strategic vision of the Danube Wood Cultural Route into actionable, region-specific measures. Through its focus on preservation and conservation, wood-based ecotourism, sustainable forestry, and education, the RAP lays the groundwork for a sustainable and inclusive future for the Danube region’s wood heritage. By fostering stakeholder collaboration, promoting innovative tourism models, and enhancing cultural and environmental awareness, the RAP contributes significantly to the broader objective of the Danube Wood(s) Route initiative: ensuring the sustainable and long-term valorisation of the region’s rich forest-based cultural and natural resources.

2. Regional Analysis

The regional analysis of the RAP was carried out in order to find out what are the main challenges of the South-Transdanubian in Hungary identifying the main challenges and opportunities that can be address by actions elaborated later in Section 4.

2.1. Natural and cultural assets

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) released a global report in 2019 that provides a detailed overview of the drastic changes that have occurred in natural systems over the past 50-100 years. The decline of biodiversity is observable on our continent as well, and it may have specific economic impacts in the short- and medium-term, such as the drastic decline of pollinating organisms. The preservation of biodiversity and healthy functioning natural systems is essential for human well-being and the economy. This includes contributing to food security, long-term sustainable agricultural production, and the fight against climate change and invasive species.

Forests provide many provisioning, regulating and cultural ecosystem services that play an important role in maintaining a livable environment. Among other things, they help to protect soil (against water and wind erosion), protect watersheds, mitigate the effects of climate change through carbon sequestration, and their wood serves as an important raw material. They also provide biomass, one of the most important sources of renewable energy.

In light of the above, increasing forest areas in Hungary is a key objective of the National Forest Strategy for 2030, which aims to achieve a 27% forest cover level in the long term through afforestation and national reforestation programs. Another important goal for the 2016-2030 period is to create a proper balance among the diverse functions of forests.

As mentioned in the National Forest Strategy: „The forest, through the benefits it provides and its many other public interest services – including protective and recreational functions – is one of our most important natural resources and a significant national treasure.

In Hungary, each resident has access to about half the area of a football field in forested land, thanks to the continuous growth of forested areas over the past decades. The most forested regions are the Northern and Transdanubian Central Mountains, as well as the Western and Southern Transdanubia. However, in the Northern Great Plain, forest cover also approaches 12%.

The professional and sustainable management of forests is carried out by foresters (technicians, engineers). The primary goal of forestry is to meet humanity's demand for wood in a way that ensures the continuous (sustainable) maintenance of forests, taking into account conservation and ecological considerations. Forest vegetation provides medicine, food, wild food sources, and bee pastures. Forests purify the air, protect against erosion, and, not least, offer opportunities for rest and relaxation.

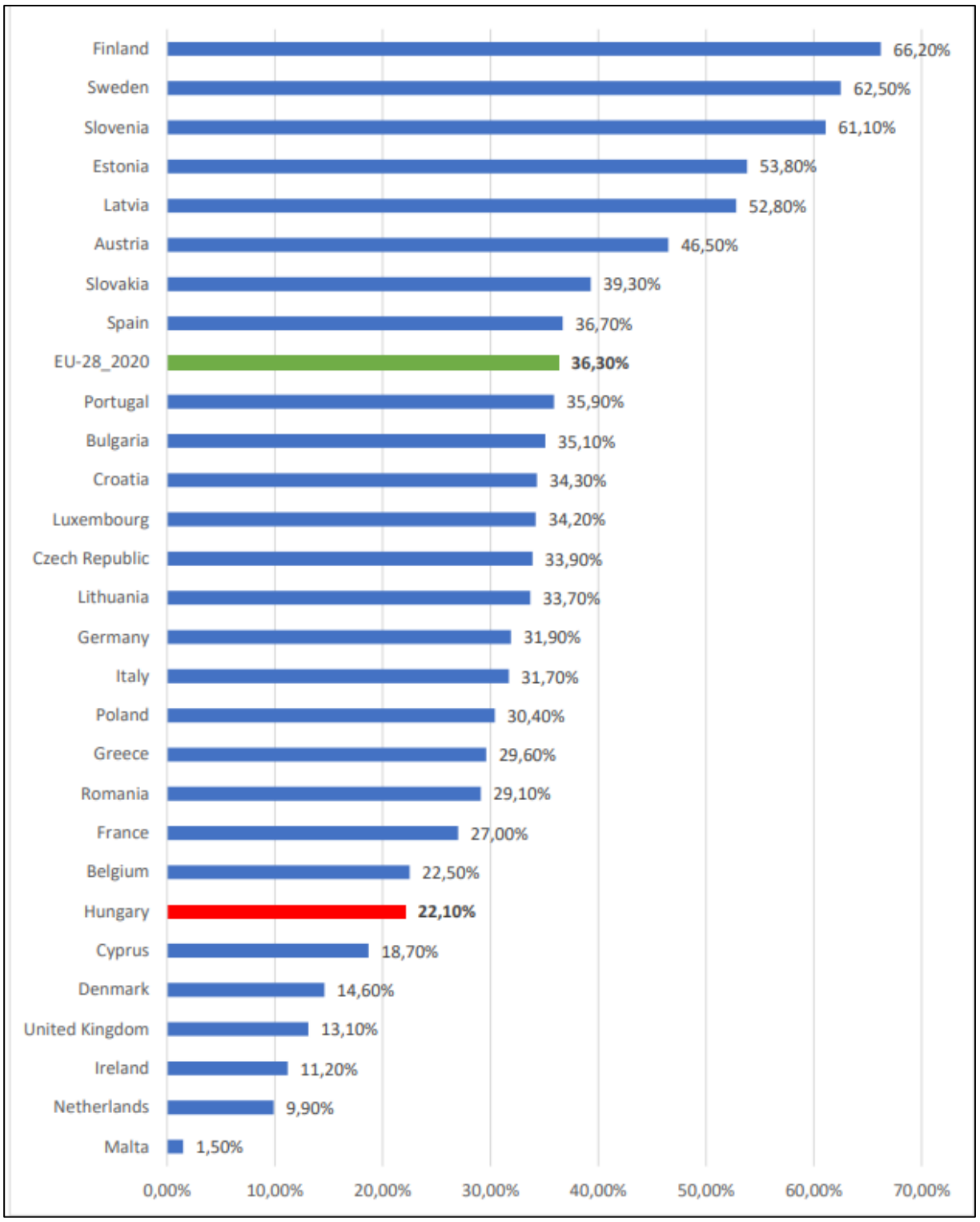
Forests cover about one-fifth of Hungary's territory. Although the country's forested area has been steadily increasing in recent years and decades, according to Eurostat data from 2020, Hungary still had the seventh lowest forest coverage in the European Union. (In 2006, at the beginning of the National Forest Program cycle, forests covered 19.9% of the country.)

Among the EU member states, Finland (66.2%), Sweden (62.5%), and Slovenia (61.1%) are the leaders in forest coverage. According to Eurostat data, the average forest coverage in the 28 EU member

states in 2020 was 36.3%. Therefore, it can be concluded that Hungary's forest coverage in 2020 was below the EU average.

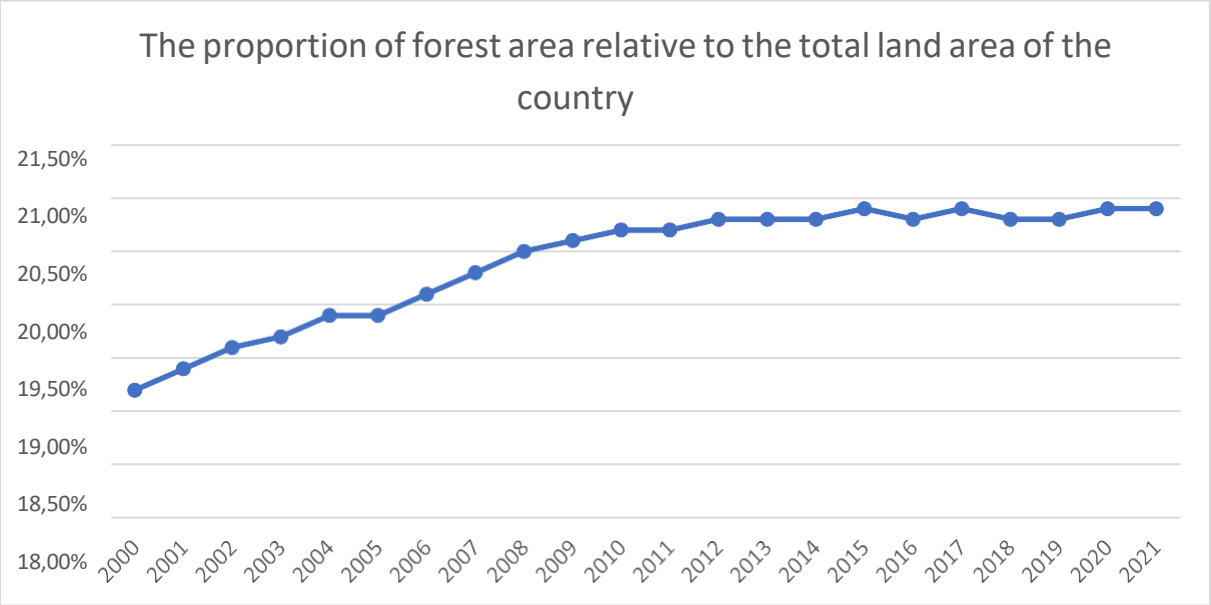
The following chart illustrates the details of the described information, with the EU average and Hungary's forest cover highlighted in different colors for better visibility.

1. Figure: Forest cover in the European Union, 2020 (EFFIX-Marketing Kft., 2025)



About 21% of Hungary's territory is covered by forests, more than half of which are state-owned. The forest area has been steadily increasing over the years as a result of afforestation programmes. The total volume of living trees in Hungary's forests is about 399 million cubic meters. The country uses half of its annual increment of forest growth. In 2014, the total area of forests managed under continuous forest management regimes (such as selective cutting/permanent forests, conversion/transition forests and non-wood-producing forests) was 151,507 ha, which will increase to 183,288 ha by 2020.

Since the year 2000, Hungary's forest area has increased by 6,800 hectares by 2021. This is illustrated in the following figure.



2. Figure: The proportion of forest area relative to the total land area of the country (EFFIX-Marketing Kft., 2025)

The forest plantations of the past 70-80 years were primarily artificial forests, when 40% of Hungary's forests were planted, established mainly for timber production or other protective and community purposes, such as preventing drifting sand, erosion, and deflation, protecting weak soil, noise reduction, rapid reclamation, or creating urban walking forests with fast-growing tree species for immediate results. In these cases, biodiversity conservation was not the main priority. In cultural forests and plantations, the increase in biodiversity is more limited.

The proportion of native tree species in the forests is nearly 70%, while the remaining areas are dominated by non-native or naturalized tree species, as well as cloned varieties, such as black locust forests (23.53%) and hybrid poplar forests (5.4%). The forests are composed of 89% deciduous species and typically form mixed forest associations.

The amount of new forest plantations has continuously decreased since 2016, but it has been increasing again since 2019. Efforts to preserve land use on Natura 2000 sites, particularly grasslands, are well reflected in the fact that 93% of forest plantations between 2019 and 2021 were located outside of Natura 2000 areas. Forty-five percent of the plantations used native tree species, which is more favorable for biodiversity conservation potential, especially when multiple tree species are used instead of just one. Outside of Natura 2000 and protected natural areas, and maintaining appropriate protective distances, the establishment of forest stands primarily for timber production purposes continued, often using non-native or highly productive, resistant, improved tree species, such as black

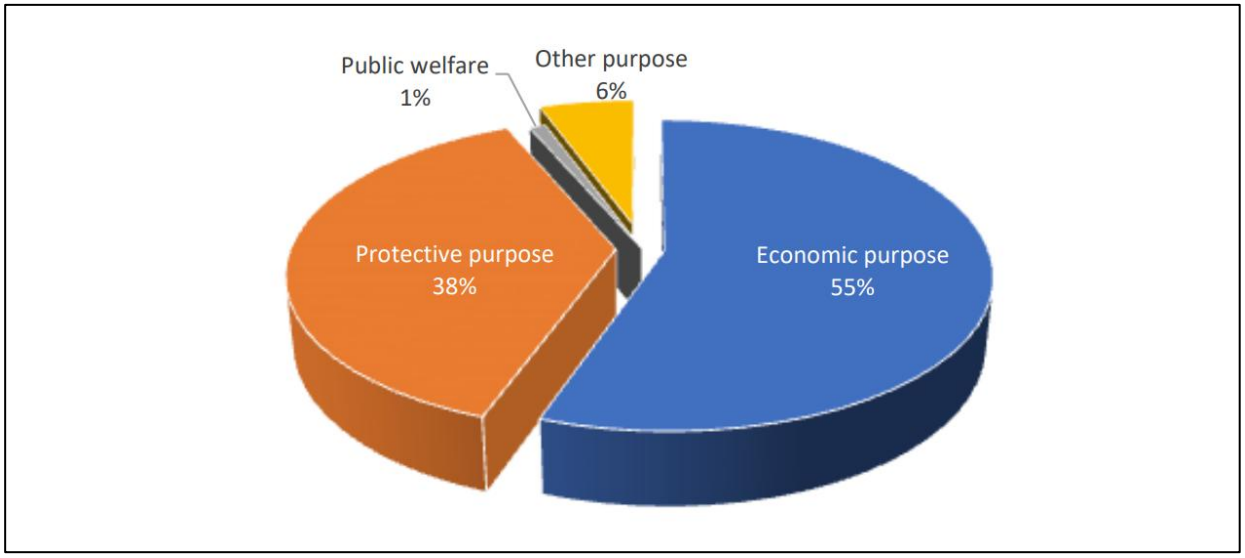
locust and hybrid poplar. Several measures have been introduced to increase the enthusiasm for forest planting again, including significant increases in unit support prices and new regulations. The afforestation efforts and the creation of agroforestry systems (such as creating forest strips for windbreaks and increasing the area of wooded pastures) have been supported by the Rural Development Program's funding schemes.

According to topographic and climatic conditions, farming methods, and historical factors, the extent of forest cover shows significant regional differences across the country.

Considering the data from 2023, we present the distribution of forest areas within Hungary's regions and counties.

In 2023, Hungary had a total of 2,074,325 hectares of forest management areas. This was distributed according to the following purposes:

3. Figure: Distribution of forest area (%), 2023, (EFFIX-Marketing Kft., 2025)



The following tables show the size of the forests in each of the regions and counties of Hungary in the year 2023.

Forest cover by county in Hungary in 2023(%)

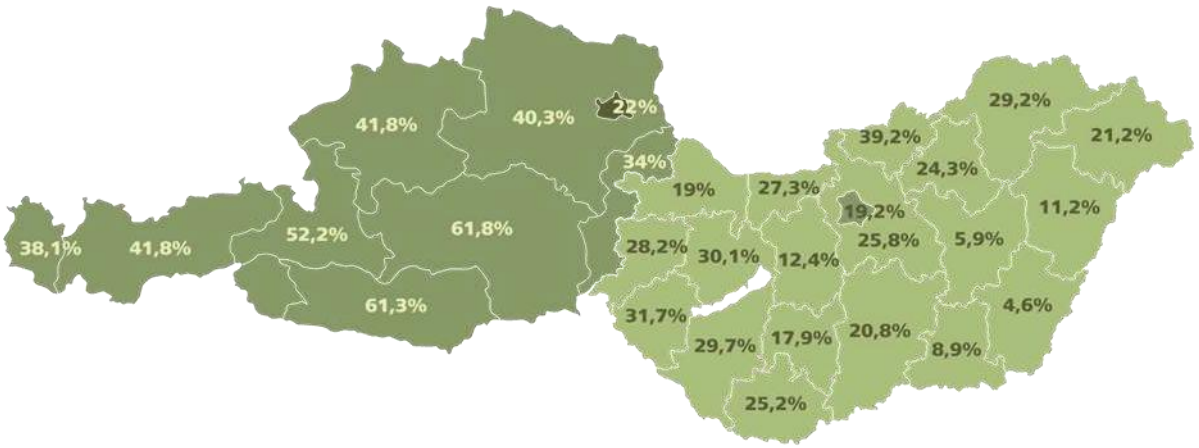
County	Forest cover (%)
Nógrád	39.5 %
Zala	31.6 %
Veszprém	30.4 %
Somogy	30.0 %
Borsod-Abaúj-Zemplén	29.6 %
Vas	28.3 %
Komárom-Esztergom	27.3 %

Forest cover by county in Hungary in 2023(%)

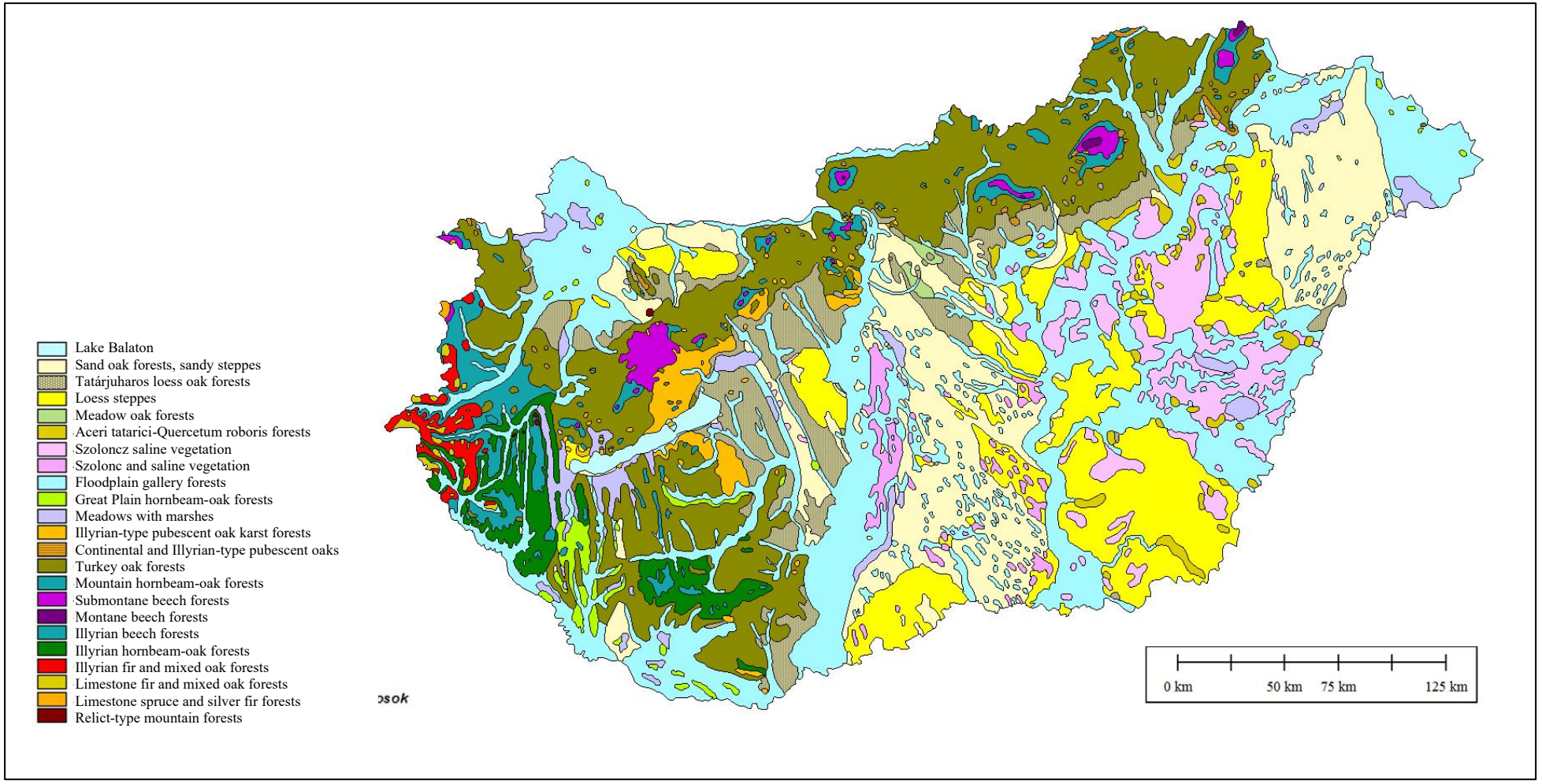
County	Forest cover (%)
Pest	25.8 %
Baranya	25.6 %
Heves	24.6 %
Szabolcs-Szatmár-Bereg	22.2 %
Bács-Kiskun	21.0 %
Győr-Moson-Sopron	19.0 %
Tolna	17.8 %
Fejér	12.2 %
Hajdú-Bihar	11.6 %
Budapest	9.8 %
Csongrád-Csanád	9.1 %
Jász-Nagykun-Szolnok	6.0 %
Békés	4.7 %

However, it is also a fact that even in the most forested regions of Hungary, the forest coverage is lower than in the surrounding countries. This is best demonstrated by the 2022 comparison between Hungary's counties and Austria's provinces.

4. Figure: Forest coverage in Hungary and Austria by county, 2022, (EFFIX-Marketing Kft., 2025)



The map below showcases the potential natural vegetation of Hungary, which would be desirable restored state of forest, however in many cases this restoration is not possible due to urbanisation, agriculture (soil degradation), water management, and the change in the country's climate and microclimates.



Hungary's forests can be described as highly diverse in terms of both species' composition and the health and naturalness of their condition.

In 2020, about 1.2 million hectares of Hungary's forested area were covered by native species. This represents a 1.6 percentage point decrease compared to the year 2000, while the area covered by native tree stock increased by 8.0%. This means that the expansion of forested areas has led to a greater spread of non-native tree species. In 2020, the proportion of native trees was 64%, while the area occupied by non-native species covered 682,000 hectares, accounting for 36% of the forested area.

In 2020, the largest portion of forested land in Hungary was occupied by non-native acacia. 87% of the standing timber stock consisted of species belonging to the temperate broadleaf forest zone.

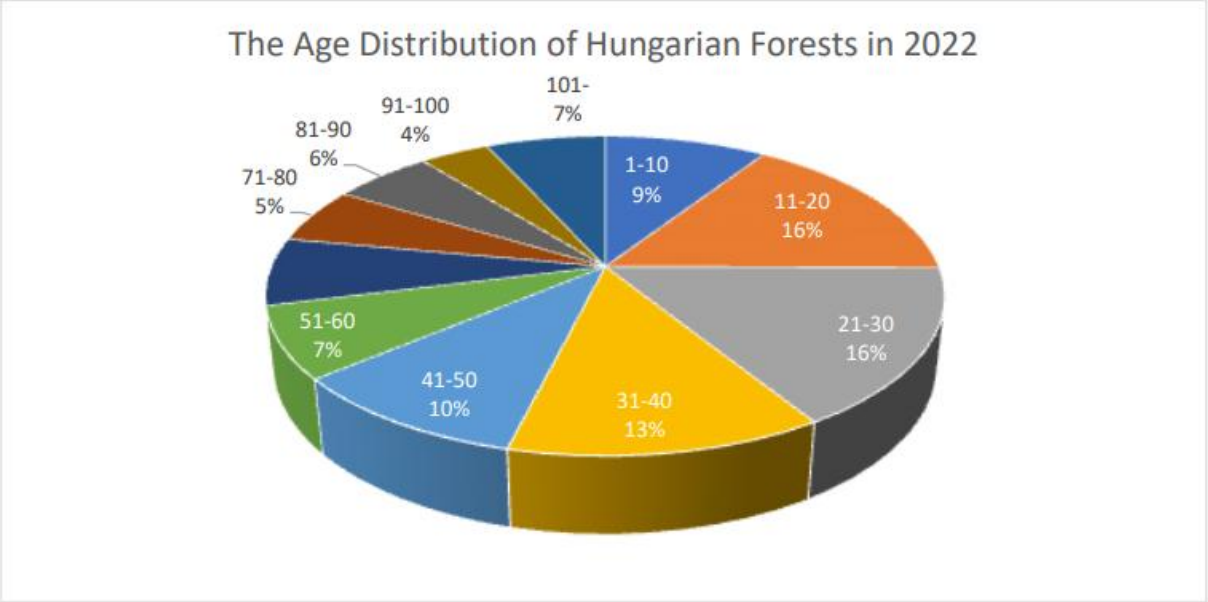
Among the native tree species, the most significant were noble oaks and beeches.

The introduced, naturalized species primarily spread due to their rapid growth or high drought tolerance. Although acacia occupies the largest forest area, in terms of standing timber, oak is the most significant (27%).

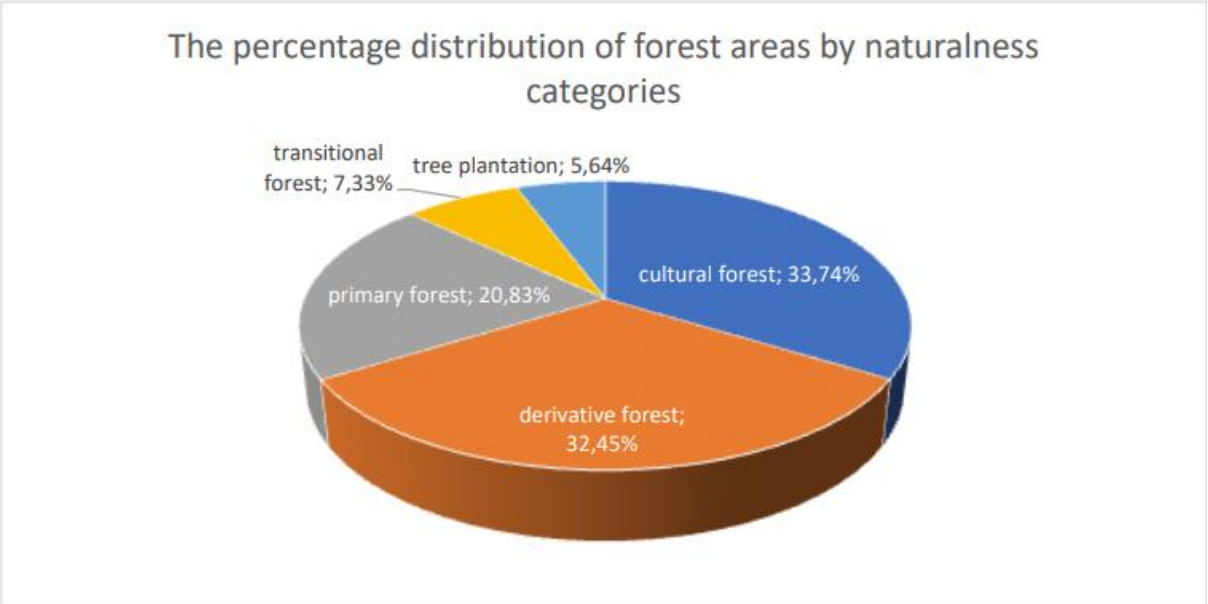
The age distribution of forests in Hungary shows a significant proportion of young and middle-aged forests.

- Forests under 50 years old account for 64.2% of the area.
- Stands older than 100 years make up 6.6%.

The aging stands are primarily composed of oak, Turkey oak, and beech species, as shown in the table below.



The following figure shows the percentage distribution of Hungarian forest areas by naturalness categories. According to the diagram prepared by the Hungarian Forestry Association based on National Land Centre data:



The established tree species composition is characterized by zonal division, which reflects the stable climatic conditions of the past centuries. Hungarian forest associations follow the zonal structure of temperate-zone forests. As the elevation above sea level increases, the average temperature decreases, and the humidity increases, which fundamentally determines which tree species thrive in which zones. Climate change is expected to modify these two parameters.

According to forestry climatic classification:

- The beech and hornbeam-oak climates are characteristic of the hilly and mountainous regions.
- The oak-hornbeam climate is found in the lower hills and some parts of the plains.
- The forest-steppe climate is typical of the Great Plain.

2.2. Social and economic conditions in the region

In 2023, the population of the more developed regions of Hungary felt the exceptionally high inflation rate the most, while areas with lower incomes experienced less of a decline in families' ability to pay. The economic downturn has hit Central Hungary the hardest, with the lowest purchasing power since early 2023. Currently, the Intrum Regional Payment Capability Index shows a value of 48.87 in this region. Economic difficulties have affected eastern Hungary less:

- In Northern Hungary, the payment capability index is 69.33,
- In Northern Great Plain, it is 68.55, and
- In Southern Great Plain, it is 69.86.

In the first quarter of 2024, payment capabilities increased significantly across most regions. The most notable growth was in Central Hungary, which includes Budapest, where it rose by 21.6% compared to the previous quarter. The payment capability also increased sharply by 17% in Southern

Transdanubia and by 11.6% in Northern Great Plain. The only region where the situation worsened compared to the previous quarter was Central Transdanubia, with a decline of 2.2%.

Although rural areas are also developing, Budapest continues to increase its economic advantage over the other regions of Hungary, leading to an ever-growing divide. A year ago, Budapest's GDP per capita was 155% of the European Union average, and it has now increased to 158%, making it the 15th highest economic performance in the EU. However, rural regions are also performing increasingly better compared to their own past, and this becomes especially visible when we look at the long-term development rather than just data from a single year.

In terms of gross domestic product, the best-performing rural region in Hungary is Central Transdanubia (Fejér, Komárom-Esztergom, and Veszprém counties), which has improved from 57% of the EU average in 2010 to 71% now. In 2010, the areas of Hungary east of the Danube and Southern Transdanubia were still below the 50% level.

However, Western Transdanubia stands out. In 2010, it was at 67% of the EU's development level, which rose to 76% by 2015, but then fell back to the original 67% level, where it had been a decade ago, and it currently shows only minimal improvement.

Although this trend appears impressive, it is important to note that, in an international context, Hungary still belongs to the lower ranks despite its development. According to Eurostat data, Hungary's GDP per capita reached 76% of the EU average last year, which is the sixth lowest among the 27 member countries.

5. Figure: GDP per Capita in Hungary's Counties, 2023, (EFFIX-Marketing Kft., 2025)

Region name	GDP per Capita (thousand HUF)
Budapest	17,146
Győr-Moson-Sopron county	8,078
Komárom-Esztergom county	7,658
Fejér county	6,901
Pest county	6,676
Vas county	6,254
Veszprém county	6,04
Csongrád-Csanád county	5,922
Bács-Kiskun county	5,827
Heves county	5,7
Hajdú-Bihar county	5,685
Tolna county	5,402
Baranya county	5,373
Zala county	5,369
Borsod-Abaúj-Zemplén county	4,987
Jász-Nagykun-Szolnok county	4,894
Szabolcs-Szatmár-Bereg county	4,521

Békés county	4,387
Somogy county	4,736
Nógrád county	3,463
Hungary TOTAL	7,828

In the Southern Transdanubia, Northern and Southern Great Plain, and Northern Hungary regions, the proportion of people living in poverty is exceptionally high, exceeding 15%. In the Northern Great Plain, it is 16%, and in Northern Hungary, it is 15.4%, which still represents a two-percentage point improvement compared to 2021. The poverty rate is lowest in Central Transdanubia and Budapest, with figures of 7.5% and 7.7%, respectively.

The proportion of early school leavers in the 18-24 age group is highest in the Northern Hungary region at 23.6%, meaning nearly a quarter of the population is affected.

Additionally, the percentage of early school leavers is above the national average in the Southern Transdanubia and Northern Great Plain regions as well. The situation is somewhat better in the Southern Great Plain (11.7%) and Central Transdanubia (9.8%), where the rate is slightly below the national average. Central Hungary is already 5% below the national average, while the Western Transdanubia region has an exceptionally low index of 6.1%, showing a decrease compared to the previous year.

2.3. Woodworking in Hungary

Woodworking has been a vital part of Hungary's economy and society for centuries. Even in regions with scarce wood resources, such as the Great Hungarian Plain, farmers crafted essential wooden tools for household and agricultural use. By the 16th and 17th centuries, woodworking extended beyond self-sufficiency, becoming a thriving trade that supplied various regions. Certain villages, especially in forest-rich mountainous areas like the Bakony, Börzsöny, and Bükk regions, became specialized centres of woodworking.

As urbanization progressed, woodworking diversified into distinct trades, such as carpentry, turning, coopering, and wheelwrighting. By the late Middle Ages, guilds were established in Hungarian cities, uniting craftsmen and ensuring a steady supply of wooden tools and products for a growing population. However, not all woodworking was conducted within formal guild structures. Many rural artisans and unskilled peasant woodworkers operated outside the guild system, producing items such as wooden forks, spools, and roofing shingles, often supplying regions where formal artisans were scarce.

By the early 20th century, woodworking and related trades were deeply embedded in the Hungarian economy. A 1902 census recorded nearly 12,000 families across 753 villages engaged in various woodworking industries, with many specializing in cartwrighting, shingle making, and the production of agricultural tools. This rich tradition has continued to evolve, with several craft practices still thriving today. The heritage of glassblowing, for instance—which historically relied heavily on firewood and potash (hamuzsír)—not only exemplifies the intersection of cultural and ecological heritage but has also been under UNESCO consideration since 2024, further enhancing its relevance to the Danube Wood(s) Cultural Route. Similarly, the *Óbánya Orgona Manufaktúra*, known for its high-quality wooden furniture, represents a living legacy of artisanal excellence. The region is also home to two active cooperages, *TrustHungary* and *Európai Kádárok*, preserving the traditional craft of barrel-making, which remains a valuable and thematically fitting element for inclusion in the cultural narrative of the Route. These contemporary examples underscore the enduring significance and adaptability of wood-based crafts in Hungary's cultural landscape.

With the rise of industrialization and technological advancements, the number of traditional wood-related trades has significantly declined. Mass production and the availability of alternative materials have led to a reduced demand for handcrafted wooden products. Additionally, social and economic changes have diminished the role of cottage industries, which once provided livelihoods for many rural families.

One of the biggest barriers to the growth of modern woodworking industries in Hungary is the slow adoption of timber-based architecture. Unlike neighbouring countries, Hungary has been resistant to using wood as a primary building material. The dominant belief remains that houses should be built from "stone" (primarily brick and concrete), limiting the expansion of sustainable timber construction, including lightweight and cross-laminated timber (CLT) buildings.

2.4. Summary of the regional assessment

Biodiversity and natural resources in Hungary's forested areas are closely tied to forest management and the protection of local ecosystems. Forests play an essential role in preserving biodiversity, hosting many species, including protected, rare, and endemic ones. Several of the country's forests are under special protection, but it is notable that only a few hundred hectares are considered to be in their natural state. This issue is exacerbated by overpopulation of wildlife, the effects of climate change, and the spread of invasive species.

Some forests resemble intensive agricultural cultures (composed of foreign species and/or genetically modified varieties, artificially renewed), often referred to as plantation forests. The necessary maintenance of plantation forests is justified, as they partially relieve the pressure on more natural forests while also serving a protective role. Natural, near-natural, and derived forests cover approximately 1.03 million hectares (53%) of the country, while transitional and cultural forests, as well as wood plantations, cover around 900,000 hectares (47%).

Although there is political will to strengthen nature conservation and preserve natural values, the practice across the country shows that the size of natural habitats continues to shrink, even with the growing forest coverage. Public environmental awareness is also on the rise, though it remains well below the Western European average, despite increasing expectations for a healthy living environment and the professional management of natural resources.

In terms of biodiversity, Hungary's forests host a diverse range of plant life, including native tree species, herbaceous plants, mosses, lichens, and fungi, all of which are crucial for maintaining the soil and microclimate of the forest. The rise of forest fires, a rare occurrence in Hungary, this year, along with timber extraction and the spread of invasive species, may reduce the diversity of natural vegetation.

The characteristic fauna of forests includes wild boar, deer, roe deer, foxes, and various bird species. Due to an excessive wildlife population, forest management faces growing challenges, while hunting and the spread of invasive species, along with the loss of natural forests, further threaten biodiversity.

Forested areas provide habitat for wildlife and a variety of natural resources, such as timber, firewood, medicinal herbs, fungi, and game. Forest management, firewood harvesting, and biomass production are important economic activities. However, forest fires, excessive timber harvesting, pollution, and the decline of biodiversity could endanger the long-term sustainability of these resources.

The social and economic conditions in rural areas significantly impact forestry and sustainable forest management. The forestry sector in rural areas is characterized by the following features:

- Labor Market Situation: Rural areas often experience lower unemployment, with agriculture and forestry serving as the primary sources of livelihood. The timber industry, firewood harvesting, and biomass utilization play a key role. Forestry creates important jobs for the local economy, particularly in the forestry and timber sectors.
- Demographic Trends: The migration of young people and an aging population in rural areas result in a decreasing number of locally employed forestry professionals, which could hinder the long-term sustainability of forestry practices and the stability of the local economy.
- Infrastructure Issues: In forested areas, the underdevelopment of infrastructure (such as transportation networks and internet access) is often a problem. It is crucial to improve infrastructure from a forestry and timber industry perspective to better access market opportunities.

The relationship between society and nature, particularly forests, has drastically changed over the past fifty years. This process not only affects daily life and consumption habits but also fundamentally influences the functioning of the economy and politics.

To reverse the situation, it is essential to shape societal attitudes, which can be achieved by strengthening education and environmental awareness. The rising generations cannot repeat the mistakes of their predecessors – they must actively participate in correcting past issues. To do this, educational programs are needed that lay the foundation for environmental consciousness at a young age while also engaging the adult population.

In addition, the "One Health" concept emphasizes that the health of humans, animals, plants, and the environment forms a close unity, and a healthy society cannot exist on a sick planet. This perspective is especially significant in forest management, as it highlights the interconnections between ecosystems.

In the coming years, the renewal for sustainability will impact every field, from ecology to economics. This process will not be limited to the forestry sector but will require broader cooperation among different segments of society. Creating new knowledge and sharing it effectively will be crucial in solving the issues at hand.

Achieving a sustainable future also requires strengthening community participation. Local initiatives, such as community-based forest management programs, provide opportunities for the active involvement of the population, thereby strengthening the connection to nature. Alongside these efforts, government support and the thoughtful development of policies are essential to ensure a long-term balance between environmental protection and economic interests.

2.5. Challenges and opportunities

The following chapter summarises the challenges and opportunities identified in Regional Analysis.

Forest Resilience Against Climate and Ecological Threats

Forests will face growing challenges due to climate change, extreme weather, pests, and invasive species, which can lead to large-scale tree die-offs and ecosystem degradation. Traditional reactive forestry measures are no longer sufficient, as damage can be unpredictable and difficult to reverse. Instead, proactive strategies—such as early detection, adaptive management, and improved forestry practices—are essential to enhance forest resilience.

A key focus must be on genetic conservation, ensuring the adaptability of tree species by preserving seed-producing stands, provenance regions, and forestry gene reserves. Sustainable forest

management should align with conservation objectives to mitigate ecological damage and maintain biodiversity. At the same time, forests play a crucial role in balancing environmental changes through carbon sequestration and afforestation efforts.

To meet these challenges, collaboration between forestry, research, and education is necessary. Enhancing adaptability through innovative forest management, genetic conservation, and wildlife strategies will help ensure that forests remain sustainable and resilient in the face of future environmental changes.

Adapting Forestry to Economic and Environmental Challenges

Forestry in Hungary is shifting towards a more sustainable and multifunctional approach, balancing economic needs with ecological responsibilities. The increasing importance of carbon sequestration, biodiversity conservation, and protective functions like soil stabilization requires tailored strategies for different forestry models, including plantation, traditional, and near-natural management. The rising demand for wood products, firewood, and biomass energy necessitates new technologies and resource-efficient solutions. Additionally, economic factors such as carbon trading and changing land ownership structures influence forestry practices. To ensure long-term sustainability, forestry must integrate with rural development, improve infrastructure, and adopt policies that align environmental conservation with economic viability.

Wildlife management must also adapt to modern forestry demands while addressing damage caused by overpopulated species. Effective policies should integrate ecological, economic, and conservation perspectives to create a framework that supports both forest health and profitability. Additionally, the increasing risk of invasive species and new pests requires continuous monitoring and research, as well as technological advancements in forest protection.

An essential tool used by forestries is achieved by "Örökerdő" or continuous-cover forestry model, which is widely regarded across Europe as a best-practice approach for sustainable forest management under changing climate conditions. This is combined with the use of southern-origin reproductive plant materials sourced from Bulgaria and Turkey to promote forest resilience and maintains Hungary’s first national-level seed storage facility in Abaliget, established on Serbian and Croatian models.

Tourism based on the cultural and industrial heritage of wood

One of the main challenges is preserving the current state of wooden heritage sites and ensuring they are accessible and engaging for visitors, while also educating them about sustainable use. Traditional woodworking crafts are disappearing, knowledge transfer is difficult, and involving younger generations and activating local communities often proves to be a hurdle.

At the same time, there is a wide range of opportunities: thematic routes, interactive craft workshops, wood architecture festivals, and digitally supported experiences (e.g. 3D modelling, virtual tours) can all make this form of tourism attractive. Showcasing sustainable wood use, boosting the local economy through craft-based tourism, and connecting with ecotourism can all create long-term value. The key to success lies in strategic collaboration between actors in the woodworking industry, tourism, and education, as well as the adaptation of international best practices.

Challenges and Solutions in the Social Context

The changing relationship between society and forests presents both challenges and opportunities that significantly impact sustainable forest management. Over the past decades, urbanization, modern lifestyles, and shifting consumption habits have weakened the intellectual and emotional

connection between people and nature. This disconnect has resulted in reduced awareness and insufficient incentives to address environmental challenges effectively. To reverse this trend, strengthening environmental education and public awareness is essential. Ensuring that future generations actively engage in conservation efforts requires long-term investment in education, communication, and cross-sector collaboration.

Rural social and economic conditions also shape forestry sustainability. While forestry remains a key employment sector in rural areas, migration trends and an aging workforce threaten its future. The declining number of young forestry professionals may lead to skill shortages and weaken long-term forest management efforts. At the same time, underdeveloped infrastructure, such as poor transportation and limited internet access, restricts market opportunities and investment in forestry-related industries. Addressing these issues requires targeted policies to improve infrastructure, support local employment, and create incentives for young professionals to remain in the sector.

Solutions must go beyond policy changes and involve direct community participation. The interconnectedness of human, animal, plant, and environmental health reinforces the need for sustainable forest management. Community-based forest management programs can encourage active involvement, fostering a stronger bond between society and nature. Additionally, innovative economic approaches, such as carbon sequestration initiatives and sustainable eco-tourism, can provide financial incentives for conservation. Governments must play a crucial role in shaping policies that balance economic development with environmental protection, ensuring that forests continue to provide essential ecological and social benefits for future generations.

6. Figure: Identified challenges and opportunities

No.	Challenges	Opportunities
1	Climate change: Effects of warmer and drier weather on tree growth and water usage.	Development of sustainable forestry and increased utilization of biomass.
2	Increasing climatic extremes.	Growing public demand for environmentally conscious lifestyles that consider biodiversity conservation.
3	Increasing climate-related threats (extreme weather, pests, invasive species) leading to tree die-offs and ecosystem degradation.	Implementation of proactive forest resilience strategies (e.g., early detection, adaptive management, genetic conservation).
4	The rate and scale of climate change challenge forests' adaptability.	Incorporating environmentally friendly and climate-conscious management and economic approaches into education at all levels, starting with secondary education.
5	Pollution (e.g., air, water, and soil pollution) in forested areas negatively impacts biodiversity.	Protection of forests, especially preserving habitats of rare and protected species.

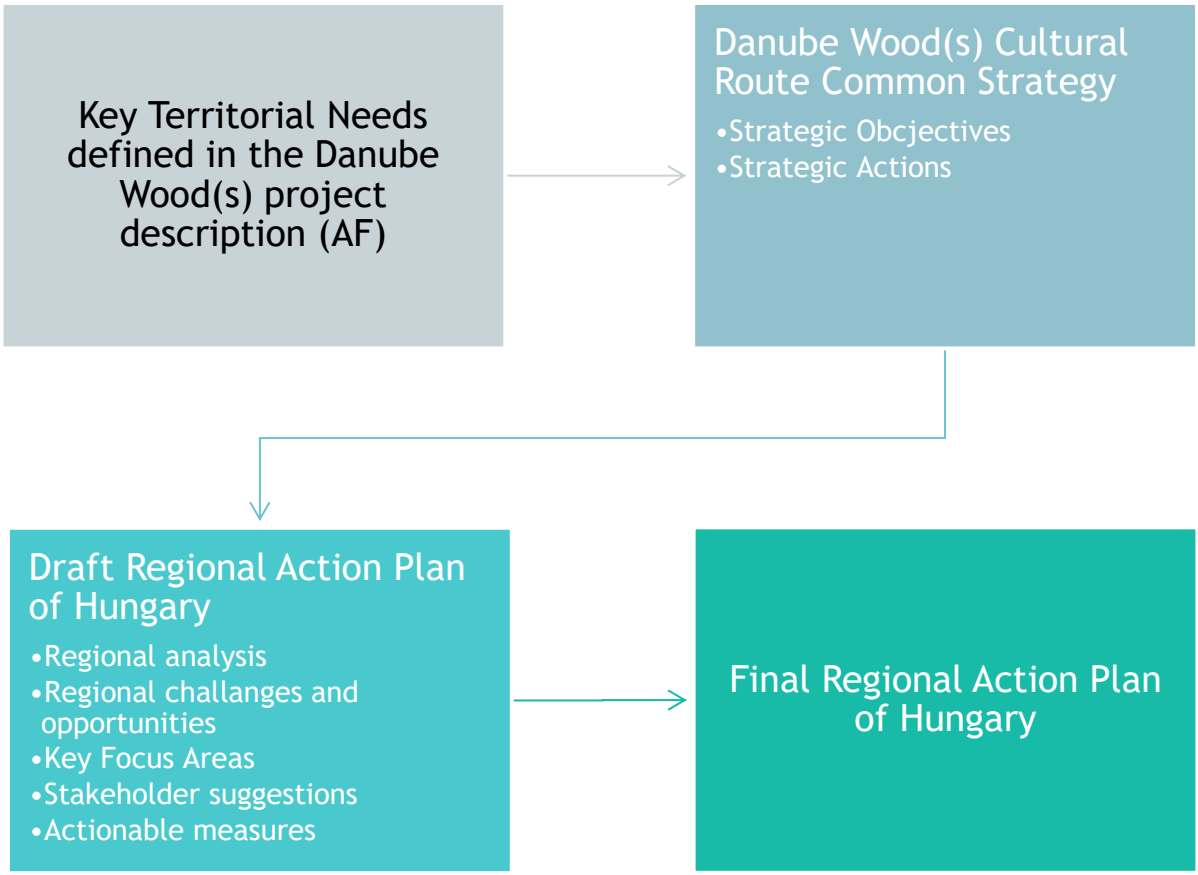
No.	Challenges	Opportunities
6	Further habitat degradation, especially regarding ecosystem transitions (e.g., forest edges, disappearance of tree groups, small water bodies).	Bridging gaps in underdeveloped regions by promoting environmentally friendly farming and developing a regional policy in collaboration with neighbouring countries.
7	Significant further spread of invasive alien species and the introduction of new ones.	Easier mobilization of companies to support concrete biodiversity conservation projects to enhance their environmental/green image.
8	Deforestation: Illegal logging, urbanization, and agricultural expansion threaten forest areas.	Strengthening resistance against forest fires and invasive species.
9	Unfavourable land-use trends.	Strengthening environmental education and ecotourism through broader promotion of conservation.
10	Increasing land demands of infrastructure and investments at the expense of natural and near-natural areas.	Further promotion of nature-based forestry practices.
11	Further intensification of agricultural production, increasing the proportion of large-scale monoculture farming.	Embedding knowledge of the importance and preservation of biodiversity as a core competency in agricultural and forestry training.
12	The presence of light pollution.	Support for sustainable forestry practices that promote biodiversity to ensure forest preservation.
13	Unsustainable growth in biomass utilization for energy purposes.	Support controlled biomass use with long-term planning.
14	The focus on growth driven by natural capital competes with the current consumer society, which is unprepared for the necessary shift to long-term biodiversity preservation.	Prioritizing biodiversity and ecosystem preservation criteria in the development of support systems.

No.	Challenges	Opportunities
15	Biodiversity conservation considerations are inadequately or not integrated into sectoral policies.	Introduction of biodiversity-supporting conditionality and agro-ecological support measures under the Common Agricultural Policy.
16	The dominance of short-term economic interests over medium- and long-term environmental, social, and economic goals.	Economic recognition of the value of biodiversity and ecosystem services.
17	The pressures from socio-economic growth exceed the carrying capacity and resilience of environmental systems.	Expanding farmers' knowledge and strengthening public awareness regarding climate change, biodiversity, and ecosystem services.
18	Further decline in pollinator populations.	Cultivators of forests including owners have to be informed on how can their work be more fruitful for other types of agricultural land-use and vica-versa, while the awareness of decision makers have to be raised to align subsidy schemes with these efforts.
19	The status of natural values in protected and Natura 2000 areas could be significantly endangered by direct and indirect effects of improper management.	Underutilized potential for education and awareness-raising provided by national park administrations, state forestry companies, botanical gardens, nature parks, geoparks, and public collections.
20	Without compensation for income loss, less biodiversity-friendly but more profitable farming practices will persist on private lands.	Prioritizing brownfield sites and industrial zones for investments and site selection.
21	Disconnection between people and forests due to urbanization and modern lifestyles.	Strengthening environmental education and awareness to rebuild emotional and intellectual bonds with nature.
22	Insufficient emphasis on environmental awareness and conservation in public education.	Engage students through educational programmes dedicated to environmental protection.
23	Lack of support for forest-based schooling programs.	Support forest-schools and summer camps for students or families to enhance connection to nature from the young to the senior age.

No.	Challenges	Opportunities
24	Disappearing traditional woodcraft knowledge and difficulties in transferring it to younger generations.	Development of interactive workshops, cultural festivals, and digital heritage tools (e.g. 3D modelling, virtual tours).
25	Tourism challenges in maintaining wooden heritage sites while making them accessible and educational.	Synergy between sustainable tourism, local craftsmanship, and ecotourism for long-term cultural and economic value.
26	Insufficient young professionals entering the forestry sector, aging workforce.	Creation of targeted policies and incentives to support youth involvement and rural employment in forestry.
27	Inadequate rural infrastructure limiting forestry industry development.	Investment in rural infrastructure (transportation, internet) to boost local economic potential and forest-related industries.
28	Wildlife overpopulation causing forest damage.	Integrated wildlife and forest management policies combining ecological and economic perspectives.
29	Reactive forest management practices no longer sufficient in the face of rapid environmental change.	Integration of climate-conscious and multifunctional forest management approaches.

3. Strategic framework

The Danube Wood(s) RAPs have a well-defined methodological approach with the following stages:



7. Figure: Development of the Regional Action Plan

To be clear on the basis of actionable measures, the following table explains the connection of objectives between the objectives Danube Wood(s) project, the Danube Wood(s) Route Strategy, and the RAP. The RAP Key Focus Areas have to be in line with Strategic Actions and Objectives. Actionable measures are grouped under the RAP Key Focus Areas.

Standard, pre-defined Key Focus Areas of the RAP:

- Preservation and Conservation Initiatives — Actions to conserve forest areas and wood-based cultural heritage, like habitat restoration, reforestation, and the promotion of traditional woodcrafts.
- Economic and Tourism Development — Building an infrastructure to support tourism products that promote cultural and natural assets related to wood, including workshops, cultural routes, and eco-tourism initiatives.
- Educational and Awareness Campaigns — Increasing local and stakeholder awareness about the importance of sustainable forest management and wood-based heritage.

New arrangement of RAP Key Focus Areas corresponding to the Regional Analysis:

- **Preservation and Conservation of Local Wood Heritage** – Integrated actions aimed at protecting natural forest ecosystems and safeguarding the cultural legacy of wood through habitat restoration, biodiversity conservation, and the revitalization of traditional crafts and wooden architecture.
- **Promotion of Wood-Based Ecotourism** – Development and promotion of sustainable, nature-based tourism offerings that highlight forest landscapes and wood-related cultural heritage, while supporting rural economies and raising environmental awareness through experiential travel and educational engagement.
- **Sustainable Forestry and Wood-Based Economy Development** – Fostering an innovative and climate-resilient forestry sector that balances ecological sustainability with economic viability through responsible resource use, carbon market integration, and the advancement of green technologies in wood-based industries.
- **Education and Awareness for Sustainable Forestry and Wood Heritage** – Strengthening public and professional knowledge of sustainable forest management and wood culture through targeted educational programs, community involvement, cross-sector collaboration, and accessible knowledge-sharing platforms.

8. Figure: Strategic framework of the Regional Action Plan (RAP)

Strategic Objectives (project and strategic objectives)	**Danube Wood Cultural Route Strategic Actions**	**RAP Key Focus Area**
Key Territorial need: Valorising cultural heritage related to wood through stakeholder engagement and knowledge-sharing ***Danube Wood Cultural Route Strategy Objective:*** Protect and restore biodiversity and natural resources.	1. Promote conservation of historical wooden structures, traditional crafts, and forest-based cultural sites. 2. Support reforestation and biodiversity conservation efforts to maintain forest ecosystems. 3. Establish wood heritage centres, exhibitions, and museums to showcase traditional woodworking techniques and tools. 4. Develop transnational partnerships for joint heritage conservation projects.	**Preservation and Conservation of Local Wood Heritage**

Strategic Objectives (project and strategic objectives)	Danube Wood Cultural Route Strategic Actions	RAP Key Focus Area
Key Territorial need: Developing new ecotourism structures and services to drive sustainable regional growth. ***Danube Wood Cultural Route Strategy Objective:*** Develop sustainable tourism and create the cultural route.	5. Design and implement the **Danube Wood Cultural Route**, mapping heritage sites and defining tourist itineraries. 6. Develop visitor infrastructure such as eco-lodges, information centres, and thematic walking trails. 7. Create tourism packages combining forest-based experiences, cultural visits, and traditional woodworking workshops. 8. Organize wood-themed cultural festivals and community events to attract visitors and promote local craftsmanship.	**Promotion of Wood-Based Ecotourism**
Key Territorial need: Encouraging innovation in ecotourism and sustainable use of wood resources. ***Danube Wood Cultural Route Strategy Objective:*** Develop a sustainable forest-based economy.	9. Promote **sustainable forestry certification** and responsible forest management practices. 10. Encourage **local entrepreneurship** in wood-based industries, including eco-friendly furniture, bio-based materials, and traditional crafts. 11. Support **carbon trading** and **financial incentives** for sustainable forest management. 12. Foster **research and innovation** in wood-based construction, including promoting **CLT (cross-laminated timber) technology**.	**Sustainable Forestry and Wood-Based Economy Development**
Key Territorial need: Enhancing the visibility of Danube forests and their cultural heritage. ***Danube Wood Cultural Route Strategy Objective:*** Raise awareness and build community engagement.	13. Introduce **wood heritage and sustainable forestry education** in schools and vocational training. 14. Organize community workshops and public awareness campaigns on biodiversity conservation and cultural heritage. 15. Develop **digital platforms** and multimedia content to promote the sustainable use of wood and traditional crafts. 16. Establish knowledge-sharing networks connecting **academia, forestry professionals, and policymakers** to integrate research into practical forestry solutions.	**Education and Awareness for Sustainable Forestry and Wood Heritage**

4. Actionable measures

The following tables showcase in two different ways the identified actionable measures in Hungary. Two of these measures will be elaborated further, based on the stakeholder reviews, and suggestions.

9. Figure Actionable Measures addressing the identified challenges

No.	Actionable Measures	RAP Key Focus Areas
1	*Forest Protection and Restoration*	**Preservation and Conservation of Local Wood Heritage** Integrated actions aimed at protecting natural forest ecosystems and safeguarding the cultural legacy of wood through habitat restoration, biodiversity conservation, and the revitalization of traditional crafts and wooden architecture.
	a) Implement afforestation and habitat restoration projects prioritizing native species to enhance resilience to climate change and pests.	
	b) Strengthen forestry genetic conservation programs, ensuring the maintenance of provenance regions, seed-producing stands, and forestry gene reserves.	
	c) Establish wildlife-friendly forest management strategies that balance timber production with ecosystem preservation.	
2	*Biodiversity and Ecosystem Conservation*	
	d) Introduce sustainable forestry practices, emphasizing near-natural forest management and long-term ecosystem health.	
	e) Strengthen monitoring systems to detect climate-related damage and the spread of invasive species.	
	f) Protect forest areas critical to biodiversity, particularly within Natura 2000 and other protected regions.	
3	*Cultural Heritage Preservation*	
	g) g) Support traditional woodcraft revival initiatives, providing funding and/or market access for artisans.	
	h) Integrate traditional woodworking techniques into modern sustainable forestry practices.	
	i) Promote cultural heritage tourism centred around woodcraft and historic forest-based communities.	
4	*Economic and Tourism Development*	**Promotion of Wood-Based Ecotourism** Development and promotion of sustainable, nature-based tourism offerings that highlight forest landscapes and wood-related cultural heritage, while supporting rural economies and raising
	j) Establish thematic eco-tourism trails with guided tours, interactive exhibits, and educational signage.	
	k) Support sustainable nature-based tourism that promotes conservation while benefiting rural communities.	
	Sustainable Infrastructure for Forestry and Tourism	

No.	Actionable Measures	RAP Key Focus Areas
5	l) Invest in eco-friendly visitor centres, research stations, and forest-based educational trails.	environmental awareness through experiential travel and educational engagement.
	m) Promote sustainable transport options, such as electric shuttles and cycling routes, to minimise environmental impact.	
	n) Ensure proper land-use planning to prevent tourism-related degradation of forested areas.	
6	*Sustainable Forestry Economy and Innovation*	**Sustainable Forestry and Wood-Based Economy Development** Fostering an innovative and climate-resilient forestry sector that balances ecological sustainability with economic viability through responsible resource use, carbon market integration, and the advancement of green technologies in wood-based industries.
	o) Encourage participation in carbon trading and payment-for-ecosystem-services schemes as financial incentives for sustainable forestry.	
	p) Support technological advancements in sustainable wood utilization, including energy-efficient processing and alternative uses for byproducts.	
	q) Foster innovation in wood-based industries, encouraging sustainable construction materials and eco-friendly wooden products.	
7	*Community Engagement on Forest Protection*	**Education and Awareness for Sustainable Forestry and Wood Heritage** Strengthening public and professional knowledge of sustainable forest management and wood culture through targeted educational programs, community involvement, cross-sector collaboration, and accessible knowledge-sharing platforms.
	r) Organize public workshops and forums to promote awareness of sustainable forestry and climate resilience.	
	s) Develop media campaigns highlighting the role of forests in carbon sequestration, biodiversity conservation, and eco-tourism.	
	t) Strengthen local stakeholder networks to encourage community participation in forest conservation.	
8	*Forest-Based Educational Programs*	
	u) Integrate sustainable forestry and climate adaptation strategies into school curricula.	
	v) Establish forest-based schooling programs that provide hands-on learning experiences.	
	w) Increase funding for forest research initiatives and outdoor learning opportunities.	
9	*Stakeholder Training and Cross-Sector Collaboration*	
	x) Provide targeted training programs for forestry professionals, landowners, and policymakers on adaptive forestry techniques.	
	y) Foster collaboration between academic institutions, forestry professionals, and policymakers to translate research findings into practical applications.	
	z) Create regional knowledge-sharing platforms to facilitate best practices in sustainable forestry.	

10. Figure: Actionable measures building on Strategic Actions

Strategic Actions	Actionable Measures
1. Promote conservation of historical wooden structures, traditional crafts, and forest-based cultural sites.	g) Support traditional woodcraft revival initiatives, providing funding and market access for artisans. h) Integrate traditional woodworking techniques into modern sustainable forestry practices. i) Promote cultural heritage tourism centred around woodcraft and historic forest-based communities.
2. Support reforestation and biodiversity conservation efforts to maintain forest ecosystems.	a) Implement afforestation and habitat restoration projects prioritizing native species to enhance resilience to climate change and pests. b) Strengthen forestry genetic conservation programs, ensuring the maintenance of provenance regions, seed-producing stands, and forestry gene reserves.
3. Establish wood heritage centres, exhibitions, and museums to showcase traditional woodworking techniques and tools.	h) Integrate traditional woodworking techniques into modern sustainable forestry practices.
4. Develop transnational partnerships for joint heritage conservation projects.	i) Promote cultural heritage tourism centred around woodcraft and historic forest-based communities.
5. Design and implement the Danube Wood Cultural Route, mapping heritage sites and defining tourist itineraries.	j) Establish thematic eco-tourism trails with guided tours, interactive exhibits, and educational signage.
6. Develop visitor infrastructure such as eco-lodges, information centres, and thematic walking trails.	l) Invest in eco-friendly visitor centres, research stations, and forest-based educational trails. m) Promote sustainable transport options, such as electric shuttles and cycling routes, to minimize environmental impact. n) Ensure proper land-use planning to prevent tourism-related degradation of forested areas.
7. Create tourism packages combining forest-based experiences, cultural visits, and traditional woodworking workshops.	k) Support sustainable nature-based tourism that promotes conservation while benefiting rural communities.
8. Organize wood-themed cultural festivals and community	i) Promote cultural heritage tourism centred around woodcraft and historic forest-based communities.

Strategic Actions	Actionable Measures
events to attract visitors and promote local craftsmanship.	
9. Promote sustainable forestry certification and responsible forest management practices.	d) Introduce sustainable forestry practices, emphasizing near-natural forest management and long-term ecosystem health.
10. Encourage local entrepreneurship in wood-based industries, including eco-friendly furniture, bio-based materials, and traditional crafts.	p) Support technological advancements in sustainable wood utilization, including energy-efficient processing and alternative uses for byproducts. q) Foster innovation in wood-based industries, encouraging sustainable construction materials and eco-friendly wooden products.
11. Support carbon trading and financial incentives for sustainable forest management.	o) Encourage participation in carbon trading and payment-for-ecosystem-services schemes as financial incentives for sustainable forestry.
12. Foster research and innovation in wood-based construction, including promoting CLT (cross-laminated timber) technology.	p) Support technological advancements in sustainable wood utilization, including energy-efficient processing and alternative uses for byproducts.
13. Introduce wood heritage and sustainable forestry education in schools and vocational training.	u) Integrate sustainable forestry and climate adaptation strategies into school curricula. v) Establish forest-based schooling programs that provide hands-on learning experiences. w) Increase funding for forest research initiatives and outdoor learning opportunities.
14. Organize community workshops and public awareness campaigns on biodiversity conservation and cultural heritage.	r) Organize public workshops and forums to promote awareness of sustainable forestry and climate resilience. s) Develop media campaigns highlighting the role of forests in carbon sequestration, biodiversity conservation, and eco-tourism. t) Strengthen local stakeholder networks to encourage community participation in forest conservation.
15. Develop digital platforms and multimedia content to promote the sustainable use of wood and traditional crafts.	s) Develop media campaigns highlighting the role of forests in carbon sequestration, biodiversity conservation, and eco-tourism.
16. Establish knowledge-sharing networks connecting academia, forestry professionals, and	x) Provide targeted training programs for forestry professionals, landowners, and policymakers on adaptive forestry techniques.

Strategic Actions	Actionable Measures
policymakers to integrate research into practical forestry solutions.	y) Foster collaboration between academic institutions, forestry professionals, and policymakers to translate research findings into practical applications. z) Create regional knowledge-sharing platforms to facilitate best practices in sustainable forestry.

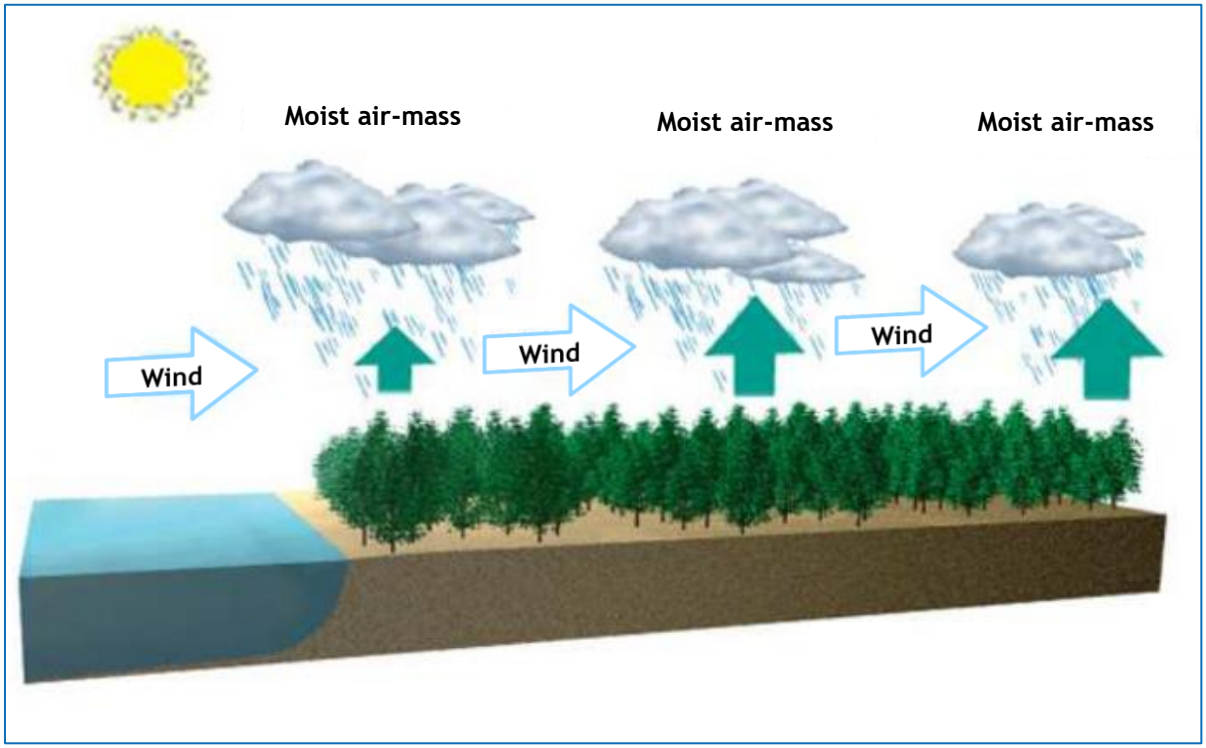
The next section is a structured elaboration of the two actions, which were selected based on their short-term feasibility while maximising long-term effect based on stakeholder suggestions.

4.1. Action 1- Organise public workshops and forums to promote awareness of sustainable forestry and climate resilience (r)

4.1.1. Relevance of the measure

Sustainable forestry and climate resilience walk hand-in-and with the ecological traditions of the Danube floodplains. Climate resilience is unachievable without sustainable forestry and water management. Water changes the face of the landscape shaping ecosystems and people. Danube floodplains in Hungary have lost their natural circumstances in the past two centuries, with only a few shores still untouched by the ever-eager urge to steer the river into a constructed bed. However, in Southern Transdanubia, floodplain forests have retained a near-natural state, providing an opportunity for conservation and education.

A key component of climate resilience is understanding the "biotic pump" effect, where forests play a crucial role in drawing moisture inland from large water bodies. This phenomenon highlights the importance of green corridors and continuous forested areas to regulate water cycles and maintain



11. Figure: The operation of the "biotic pump" with continuous forest cover (Aquaprofit Zrt., 2021), pp. 21., Figure 4.

ecological balance. Research has shown that extensive tree cover can significantly influence local and regional climate patterns by promoting evaporation and condensation cycles, leading to increased precipitation inland. Floodplain forests play a key role in the biotic pump „transporting water" from the river by rain.

Additionally, the historical land-use practices of Danube communities demonstrate a deeply rooted connection with the landscape. Traditional floodplain management involved using artificial water channels and natural wetland systems to support agriculture, fisheries, and forestry in a sustainable manner. The large volumes of water arriving annually (esp. during spring thaw), primarily from the Danube, were distributed across the vast floodplain using artificial channels and sluices. This system directed water into suitable fishing "lakes" (minor depressions in the land surface), floodplain orchards, hay meadows, and rotational grazing pastures. During periods of water recession, these channels allowed the water to return to the riverbed. These practices provide valuable insights into sustainable land management approaches that can be adapted for modern conservation strategies.

The Ancient-Drava Programme has revealed that many local residents are disconnected from the landscape, lacking awareness of their surroundings and the impacts of land-use decisions. This detachment is particularly evident among younger generations, who may not be familiar with the ecological significance of the floodplain. Addressing this gap is vital for fostering environmental consciousness and encouraging community-led conservation efforts. By reconnecting people with the land, this action seeks to promote sustainable land stewardship and resilience to climate change.

4.1.2. Nature of the action

This action aims to enhance community awareness and participation in sustainable floodplain management by offering a range of educational programs, guided tours, and expert-led discussions. Key activities include organizing public workshops, community forums, and field trips focused on sustainable forestry, floodplain ecosystems, and climate resilience. Educational materials and interactive tools will be developed to engage school groups, local residents, and policymakers, fostering a deeper understanding of the ecological importance of floodplains. Knowledge-sharing sessions will be facilitated with experts in forestry, ecology, and climate adaptation to ensure accurate and inspiring content.

The initiative will also highlight both traditional and innovative land-use practices, such as the conservation of old orchard varieties in so-called "fairy gardens" and grafting techniques. Community members will be encouraged to take part in practical conservation activities like tree planting and ecosystem monitoring, further strengthening local stewardship of floodplain landscapes.

4.1.3. Activities performed under the Action

A variety of educational and participatory activities will be implemented to raise awareness and engage the local community in sustainable floodplain management. Public workshops and community forums will serve as platforms for dialogue and learning, featuring expert-led presentations on climate resilience, floodplain ecology, and sustainable forestry. These events will be complemented by field trips and guided tours to key sites such as the Gemenc Forest Nature Trails, the Ancient-Drava Nature Trail, and the Drava Wildlife Trail, allowing participants to experience and understand the natural and cultural values of the floodplain landscape first-hand.

Educational materials, including printed guides and interactive digital tools, will be developed to engage diverse target groups—school children, local residents, and policymakers alike—ensuring that all participants gain a well-rounded understanding of floodplain ecosystems. Sessions with forestry, ecology, and climate adaptation experts will enhance the accuracy and depth of the information presented.

Traditional knowledge will also be highlighted through demonstrations of old orchard conservation, including grafting and budding techniques in "fairy gardens," showcasing sustainable land-use practices with cultural roots. Community members will be invited to take part in hands-on conservation activities such as tree planting, habitat restoration, and ecosystem monitoring, fostering a sense of ownership and stewardship.

These efforts will be organized in close collaboration with local and regional stakeholders, including the Danube-Drava National Park Directorate, forestry companies, environmental NGOs, academic institutions, and municipalities. By integrating educational initiatives with direct community involvement and showcasing both historical and innovative practices, the action will strengthen climate resilience and promote long-term sustainability in the Danube floodplain region.

4.1.4. Potential Danube Wood(s) Cultural Route points involved

The action will integrate guided tours and educational sessions along significant nature trails and cultural heritage sites within the Danube floodplain:

- **Gemenc Forest Nature Trails**: Visitors can explore the unique biodiversity of the floodplain through a series of marked trails with interpretive panels explaining the ecological and historical aspects of the region. This route highlights sustainable forestry, floodplain dynamics, and wildlife conservation efforts. (Gemenc Forest Trails)
- **Ancient-Drava Nature Trail**: This educational path provides insights into historical land-use patterns, river management strategies, and the potential for floodplain rehabilitation. The trail includes interactive features such as signposts and audio guides for self-directed exploration. (Ős-Dráva Trail)
- **Drava Wildlife Trail**: A 2 km-long route showcasing the natural values of Kerékhegy and the conservation-oriented forest management practices implemented by the Danube-Drava National Park Directorate. This trail serves as a case study for sustainable forestry. (Drava Wildlife Trail)

4.1.5. Stakeholders involved

The implementation of this action will involve a wide range of stakeholders committed to sustainable floodplain management and community engagement.

Key participants include the Danube-Drava National Park Directorate, local forestry organizations, and environmental NGOs.

Higher education institutions and research bodies specializing in forestry and climate resilience—such as the National Forestry Association (Országos Erdészeti Egyesület, OEE) and the University of Sopron's Institute of Forestry Science—will contribute expertise and scientific guidance.

Active involvement is also expected from local municipalities including the cities of Szekszárd, Pécs, and Kaposvár, alongside state-owned forestry companies operating in the region, such as Mescekerdő Zrt., SEFAG Zrt., and Gyulaj Zrt.

In addition, various agricultural enterprises and small to medium-sized businesses engaged in forestry, water management, and ecotourism will be encouraged to participate.

The coordination and facilitation of the action will be led by the South Transdanubian Regional Innovation Agency Nonprofit Ltd., ensuring smooth collaboration among all stakeholders.

4.1.6. Timeframe

- Preparation: 2 month (logistics, outreach, material development)

- Implementation: 1 month (workshops, guided tours, educational activities)

4.1.7. Indicative costs

The following costs are estimated for one workshop:

- Venue rental and logistics: 800 EUR
- Expert fees and workshop materials: 1,200 EUR
- Outreach and communication: 500 EUR

Total estimated cost: 2,500 EUR

4.1.8. Output and result indicators

- Number of workshops/forums held: 2
- Number of participants at events: 30 (15 per event)
- Number of guided tours conducted: 2
- Number of traditional agricultural techniques demonstrated: 2 (grafting and budding)
- Number of villages involved in orchard preservation efforts: 1

4.2. Action 2 - Promote cultural heritage tourism centred around woodcraft and historic forest-based communities (i)

4.2.1. Relevance of the measure

Woodworking has played a crucial role in Hungary's cultural and economic development for centuries. Despite the decline of traditional wood-related trades due to industrialization and social changes, there remains a strong heritage linked to forest-based communities, woodworking craftsmanship, and sustainable forestry. The historical woodworking practices, from guild-based carpentry to independent rural artisanship, have left a rich cultural legacy. However, the slow adoption of timber-based architecture and the decreasing role of traditional woodworking present challenges to the industry's survival.

This action aims to revitalize interest in woodworking heritage and promote it as a key cultural tourism attraction. By establishing an accessible database of woodworking-related sites and craftspeople, along with online platforms for educational and promotional purposes, the project will support the long-term sustainability of woodcraft traditions while fostering transnational collaboration along the Danube.

A crucial aspect of this action is integrating the initiative into the Danube Wood(s) Cultural Route framework. Establishing a lasting European cultural route across several Danube-adjacent countries requires the participation of regional and national stakeholders, including local governments, cultural institutions, forestry organizations, and businesses.

4.2.2. Nature of the action

The objective of this action is to promote the cultural and historical significance of woodworking and forest-based communities by creating a digital repository and fostering sustainable tourism development.

4.2.3. Activities performed under the Action

As part of this action, a comprehensive digital inventory is being developed to document woodworking heritage sites, encompassing historic sawmills, forest-based settlements, wood-related industries, and key locations of traditional craftsmanship. The database also emphasizes the cultural significance of wood applications across sectors such as furniture making, construction, shipbuilding, and musical-instrument production. To ensure broad accessibility, an interactive online platform will be created and made available to the public. This platform—potentially managed by Danube Wood(s) Project partners, local municipalities, or regional tourism forums—will serve as a dynamic resource for visitors, researchers, and cultural institutions alike.

Traditional woodcraft professions such as boat building, carpentry, joinery, woodcarving, instrument-making, and upholstery will be presented through digital storytelling formats, including videos and infographics, helping to preserve these skills and highlight their ongoing cultural relevance.

The action also supports the creation of thematic tourist trails that immerse visitors in the historical and modern practices of woodworking, offering eco-cultural experiences through several program types. These include Forest and Wood Themed Tours that combine interactive nature walks with educational insights into forestry history and wood use; visits to Wood Industry Museums and Demonstration Workshops where traditional and modern technologies are on display; and Hands-On Craft Workshops that allow tourists to create wooden objects themselves, fostering cultural exchange and skill-sharing.

The platform and its related activities will further explore the cultural significance of wood across various traditional and modern industries. In furniture making, this includes handcrafted items such as shelves, chairs, benches, tables, cradles, wardrobes, and upholstered products, with the *Óbánya Orgona Manufaktúra* standing out as a living example of high-quality artisanal woodworking. The construction sector will be represented through elements like wooden houses, timber frames, roof structures, bridges, stairs, stages, retaining walls, piers, and natural insulation such as wood wool.

The tradition of **glassblowing**, which historically depends on large quantities of firewood and potash (*hamuzsír*), provides a unique intersection of cultural and ecological heritage. Now under UNESCO consideration since 2024, it holds growing relevance within the Cultural Route. The platform will also highlight the **barrel-making (cooperage)** craft, which remains active in the region through workshops such as *TrustHungary* and *Európai Kádárok*. These represent the enduring legacy of a wood-based trade that aligns closely with the themes of the Route and is highly suitable for thematic storytelling.

Importantly, local communities and stakeholders play an active role in storytelling initiatives and oral history programs designed to preserve and communicate traditional woodworking knowledge and forest-based heritage. Finally, educational and cultural programs are held at landmark woodworking sites—such as the Orfű Mills—where guided tours and hands-on activities provide engaging, immersive experiences in traditional woodcraft and cultural traditions.

4.2.4. Potential Danube Wood(s) Cultural Route points involved

Mills of Orfű: A key heritage site showcasing traditional water mills and the history of milling families, with a strong emphasis on preserving and passing down traditional crafts to future generations.

Regional Forest Visitor Centres: These centres provide interactive exhibitions on forestry and woodworking and offer insight into the sustainable use of wood resources.

- Eco-Touristic Center Pörböly: The Forest Farm's Ecotourism Centre offers a complex service that promises exciting experiences for tourists on boots, cyclists, water tourists and forest railway enthusiasts alike. An ecotourism adventure in the Gemenese Forest can only begin at the Ecotourism Centre on the outskirts of Pörböly (https://turizmus.gemenczrt.hu/a-porbolyi-okoturisztikai-kozpont/):

- Tourists can find a buffet, a gift shop and a ticket office in the reception building, as well as the forest railway terminus, the interactive exhibition "Gemenc Treasures - Life in the floodplain forest" and the Gemenc Forest School.
- The Ecotourism Centre houses, the restored Archduke Frederick's exhibition pavilion, modelled on a hunting lodge. The building is home to the exhibition named "Legend and Reality: the Gemenc Deer". The pavilion is the starting point of the hunting trail in memory of the legendary former chief hunter István Party.

- Mecsek Discovery Center: The newest investment of Mecsekerdő Zrt., the Mecsek Discovery Center visitor centre, was completed in Árpádtető, within easy reach of both Pécs and Komló. (https://mecsekerdo.hu/okoturizmus/mecsek-discovery-center/):
- On the site of the former building of the Mókus Suli Forest School, a new building with almost zero energy requirements has been constructed to house several functions. The forest school has been equipped with high-quality, state-of-the-art educational spaces, while the MecseXplorer exhibition space on the lower level offers 140 m2 of space for visitors. A diorama of a hot spring, a high rock and pine castle, VR telescopes, a tourist house with a built-in key, an ice-cream parlour - to name but a few of the many exciting elements to discover.
  - The exhibition, which is also rich in digital content, is complemented by the Mecsek Discovery Center phone app, available in the well-known app stores. It also includes tasks related to the stations of the nearby Squirrel Trail.
  - The visitor centre offers services for families, school groups and class excursions
- DámPont Ecotourism Visitor Center: The town of Tamási in Tolna County many natural treasures and so many memories of the past, so many values, that the list could not fit in a box. We all had the same dream: we need a treasure chest! (https://www.visittamasi.hu/about-us/)
  - The two-storey building houses an interactive activity and exhibition space using digital and mechanical tools, where we have collected the treasures of the region and point the way to the original sites. The Checkers Point is the starting point, the reference point from which we point the way to our treasures.
  - With presentations, programmes and organised tours, visitors recive a generous helping hand with the experiences of our region, to show them what is worth visiting - and why - with family, colleges, class, two people or even alone with oneself.

4.2.5. Stakeholders involved

The action will engage a diverse set of stakeholders to ensure effective implementation and regional collaboration:

- **Local governments**: City of Pécs, Szekszárd and Kaposvár for tourism development and cultural promotion.
- **LEADER action groups in the Baranya County**:
  - **Csele-Borza Völgye Egyesület**: Based in Mohács, this association focuses on local development projects in the region.
  - **Dél-Baranya Határmenti Települések Egyesülete**: Headquartered in Siklós, this group serves the southern border communities of Baranya, promoting cross-border cooperation and rural development.

- **Szinergia Egyesület**: Located in Boldogasszonyfa, with a central office in Szigetvár, this association engages in various local development activities, including organizing community forums and supporting local enterprises.
- **Zengő-Duna Vidékfejlesztési Közhasznú Egyesület**: This public benefit association operates in the region, focusing on rural development initiatives.

- **Environmental and forestry organizations**:
  - Duna-Dráva National Park
  - State-owned forestry companies: Mecsekerdő Zrt, SEFAG Zrt, Gyulaj Zrt.
- **NGOs**:
  - Baranya County Rural Tourism Association - Baranya Greenways: This association focuses on developing rural tourism in the South Transdanubian region, promoting natural values, cultural heritage, and folk traditions of villages. Their experience in organizing community events and festivals centred on traditions makes them a valuable partner for promoting woodworking heritage tourism.
  - Pécs/Sopiane Heritage Nonprofit Ltd.: Established by the City of Pécs and the Local Government of Baranya County, this organization coordinates cultural heritage projects and has experience in organizing clusters related to cultural tourism.
  - SPARSE Plus Project Local Network: This network comprises villages in Baranya County, such as Szajk, Szalatnak, Hosszúhetény, Alsószentmárton, and Vásárosbéc, collaborating to host performances and cultural events.
  - Cromo Foundation: Through the COM'IN project, this foundation has worked with Roma communities in Baranya County to develop community initiatives.

The facilitator of the Action will be the South Transdanubian Regional Innovation Agency Nonprofit Ltd.

4.2.6. Timeframe

- Preparation: 3 months (database development, stakeholder engagement, platform creation).
- Implementation: 6 months (site visits, guided tours, workshops, and digital content production).
- Maintenance and promotion: Ongoing (platform updates, collaboration with European cultural route initiatives).

4.2.7. Indicative costs

- Database development and online platform: 8,000 EUR
- Workshop and tour logistics: 3,000 EUR
- Expert fees and educational material production: 3,000 EUR
- Marketing and outreach: 2,000 EUR

Total estimated cost: 16,000 EUR

4.2.8. Output and result indicators

- Number of woodworking heritage sites documented: 15
- Number of traditional woodcraft professions showcased: 5
- Number of participants in guided tours and workshops: 100

- Online platform reach (visitors per year): 500

5. Implementation plan and monitoring system

5.1. Monitoring framework

When it comes to the effectiveness of sustainable forest management and cultural heritage protection, it is essential to develop a comprehensive monitoring system. Appropriate indicators and metrics help objectively assess the progress and efficiency of Actionable measures.

To ensure transparency and accountability, a monitoring system will have to be introduced that allows for continuous tracking of both outputs and outcomes.

STRIA, as the lead partner, will take responsibility for coordinating monitoring activities, supported by a Monitoring Committee consisting of representatives from forestry companies, national parks, municipalities, NGOs, and academic partners. Monitoring will take place at multiple levels: quarterly reviews will track progress against milestones, annual assessments will measure outputs such as the number of workshops held or heritage sites documented, and biannual reviews will serve as opportunities to identify challenges and adjust implementation strategies.

The system relies on diverse tools, including event reports, online analytics, stakeholder surveys, and where relevant, environmental indicators such as biodiversity status or forest health. Results will be communicated publicly to strengthen community trust and stakeholder engagement, ensuring that all actors remain actively involved in shaping the outcomes of the RAP.

5.2. Evaluation plan

To ensure the effectiveness of actions, a well-developed evaluation plan is essential, enabling the regular review and fine-tuning of outcomes:

- Prepare annual reports on the progress of strategic objectives.
- Hold regular consultations with stakeholders to evaluate results and determine necessary adjustments.
- Involve independent experts to ensure the credibility of evaluations.
- Conduct impact assessments to analyse long-term sustainability and economic effects.

This structured evaluation system will complement monitoring by assessing the efficiency, effectiveness, and long-term impact of RAP actions.

The evaluation will proceed at four levels. **Process evaluation** will examine how well actions are being delivered and how efficiently stakeholders are engaged. **Output evaluation** will measure tangible results, for example the number of guided tours conducted, or woodworking professions showcased. **Outcome evaluation** will assess the broader effects of actions, such as increased community awareness, changes in forestry practices, or improved visibility of woodworking traditions. Finally, **impact evaluation** will analyse long-term contributions to biodiversity conservation, rural development, and eco-tourism. Independent experts from forestry and cultural heritage sectors will be invited to review reports annually to guarantee credibility and impartiality. The evaluation system will therefore not only ensure that actions achieve their numerical targets, but also verify that they create meaningful, sustainable change in line with the objectives of the Danube Wood(s) Route.

5.3. Action indicators

The table below shows the measurable indicators for the implementation of the actions:

Measure (number)	Indicator		How (method)	Who (PP or other acronym)
	Measurement unit	Value		
Action 1	Number of workshops and forums held	2	A 10-15-page summary on each workshop.	STRIA
Action 1	Number of participants at events	30	Record of participants.	STRIA
Action 1	Number of guided tours conducted	2	Organise guided tours with the help of stakeholders (i.e. Natural Parks). A 5-10-page summary on each guided tour.	STRIA
Actions 1	Number of traditional agricultural techniques demonstrated	2	Demonstrate the techniques at the workshops to participants and write a 5-page document on the two techniques.	STRIA
Action 1	Number of villages involved in orchard preservation efforts	1	Support a village in initiating the plantation and nurturing of 10 native/local trees (fruit bearing or wild). Document the type of trees, and the technique of the plantation (5 pages).	STRIA
Action 2	Number of woodworking heritage sites documented	15	Document regional wood-related industries, and key locations of traditional craftsmanship. (20 pages total)	STRIA
Action 2	Number of traditional woodcraft professions showcased	5	Workshops/guided tours should introduce woodworking professionals who keep traditions alive. Involve 5 professionals during the guided tours and workshops.	STRIA
Action 2	Number of participants in guided tours and workshops	100	Invite schools and other local communities to the events. Make a record of participants.	STRIA

Action 2	**Online platform reach**	**500**	**Besides the project website, use social media platforms and the disseminative capabilities of the stakeholders involved, to promote the platform. Make a record of website visitors.**	**STRIA**

12. Figure: Indicators for the implementation of actions

6. Potential funding opportunities

To secure funding for the proposed actions aimed at promoting cultural heritage tourism through woodcraft and historic forest-based communities, several European funding programmes can be considered:

Interreg Cross-Border Cooperation (CBC) Programmes

- Hungary–Croatia (HU–HR) CBC Programme 2021–2027
  - Priority: "Greener and low-carbon Europe" and "More social and inclusive Europe."
  - Relevant calls (expected 2025–2026): heritage valorisation, cross-border cultural tourism, ecosystem protection.
  - Potential funding: up to €1.5M per project, 85% EU co-financing.
- Hungary–Slovenia (HU–SI) CBC Programme
  - Focus: sustainable tourism and heritage-based cooperation.
  - Could support Action 2 (tourism promotion and digital platform).

Danube Region Programme 2021–2027

- Priority 2: "A greener, low-carbon and more resilient Danube Region."
- Priority 3: "A more social Danube Region."
- Relevant calls: *cultural routes, eco-tourism networks, innovation in forestry*.
- Could fund joint transnational initiatives, particularly expanding the wood-based cultural route.

LIFE Programme (2021–2027)

- Sub-programme: *Nature and Biodiversity* (for habitat restoration and biodiversity monitoring).
- Sub-programme: *Circular Economy and Quality of Life* (for eco-tourism and sustainable crafts).
- Calls expected annually with budgets between €1M–€5M.
- Could support afforestation, biodiversity monitoring, and sustainable tourism activities.

Creative Europe Programme

- Strand: *European Cooperation Projects* (medium-scale projects with budgets up to €2M).
- Eligible projects: cultural heritage preservation, cultural tourism, digital storytelling platforms.
- Highly suitable for Action 2 (woodworking heritage promotion, online platform).

Horizon Europe (Cluster 6: Food, Bioeconomy, Natural Resources, Agriculture, and Environment)

- Calls on sustainable forestry, bio-based innovation, and climate adaptation in 2025–2027 work programmes.
- Example: *HORIZON-CL6-2025-BIODIV* (biodiversity management in rural areas).
- Could fund innovative forestry techniques and pilot projects linked to Action 1.

National and Regional Funding

- **Hungarian Rural Development Programme (RDP)**: afforestation, agroforestry systems, eco-tourism infrastructure.
- **National Cultural Fund of Hungary (NKA)**: could support craft workshops, cultural festivals, and museum exhibitions linked to woodworking.

By combining these EU and national opportunities, the RAP actions can be scaled, while additional actionable measures (e.g., forest protection, eco-tourism infrastructure, education) can be activated if resources become available.

7. Conclusion

The regional analysis carried out in the Southern Transdanubian region highlighted a complex set of interlinked challenges and opportunities that shaped the design of the Regional Action Plan. Climate change, biodiversity loss, invasive species, and the overpopulation of wildlife pose growing threats to the resilience of Hungarian forests, while rural depopulation, an aging workforce, and the decline of traditional wood-related crafts further weaken the socio-economic base of forestry-dependent communities. At the same time, the analysis also identified clear opportunities in the promotion of sustainable forestry practices, the revival of wood-based cultural heritage, and the development of eco-tourism services that build on the natural and cultural assets of the region.

These findings provided the foundation for selecting the two priority actions. The first action, focuses on organizing public workshops and forums to promote awareness of sustainable forestry and climate resilience, directly responds to the ecological and social challenges identified. By reconnecting communities with forests, showcasing traditional land-use practices, and promoting innovative forestry management approaches, this action will foster greater awareness of the role forests play in climate regulation and biodiversity conservation. The second action, centred around cultural heritage tourism related to woodcraft and historic forest-based communities, addresses the loss of traditional woodworking knowledge while at the same time creating new opportunities for cultural and eco-tourism development. By combining digital heritage tools, interactive workshops, and thematic tourist trails, the action will help preserve disappearing skills and translate them into economic and educational value.

The implementation of these two actions is expected to generate tangible results in the short to medium term. Action 1 will strengthen environmental literacy among local communities, build stronger partnerships between forestry, academia, and civil society, and engage younger generations in conservation and climate adaptation efforts. Action 2 will contribute to the long-term visibility and viability of woodworking traditions, stimulate rural economies through heritage-based tourism, and provide a platform for craftspeople, cultural institutions, and tourism operators to cooperate under the umbrella of the Danube Wood(s) Cultural Route.

Beyond the selected actions, the list of additional actionable measures presents a long-term vision for the region. Forest protection and restoration projects would enhance biodiversity conservation, while innovation in sustainable forestry and wood-based economies could support the wider use of eco-friendly building materials and bio-based industries. Community engagement initiatives and forest-based educational programmes would ensure that forest values and traditions are carried forward by future generations. These measures, if financial resources become available, could significantly broaden the scope and impact of the RAP and reinforce the Danube Wood(s) Cultural Route as a transnational driver of ecological, cultural, and economic resilience.

In summary, the Hungarian Regional Action Plan translates the insights of the regional analysis into concrete, feasible measures that both address urgent ecological and socio-economic challenges and seize opportunities for long-term development. By implementing the first two actions and preparing the ground for additional measures, the RAP contributes to strengthening the ecological resilience of forests, reconnecting communities with their cultural and natural heritage, and establishing the Danube Wood(s) Cultural Route as a flagship European initiative in eco-cultural tourism promoting sustainable forestry.

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