BOOK OF PROCEEDINGS

2nd INTERNATIONAL CONFERENCE ON HOUSING, PLANNING, AND RESILIENT DEVELOPMENT OF THE TERRITORY

TOWARDS EURO-MEDITERRANEAN PERSPECTIVES

OCTOBER 16th-17th, 2025

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2nd International Conference on Housing, Planning, and Resilient Development of the Territory

Towards Euro-Mediterranean Perspectives

Conference Theme and Rationale

This conference returned for the second time within the Albanian and Mediterranean academic context, aiming to build a tradition of collaboration centered on scientific research and academia. Following the success of the first edition held on October 13th-14th, 2023, where proceedings were published in the Book of Proceedings, Albanica journal, and various international academic platforms, POLIS University and the Academy of Sciences of Albania relaunched this important event. The 2025 edition focused on housing, urban planning, and resilient territorial development, offering a platform for researchers, policymakers, and experts from the region and beyond.

Albania and the Western Balkans have faced major transformations in urbanization, spatial planning, and environmental management. Demographic changes, economic pressures, and environmental challenges created a need for new strategies in architecture, planning, and governance. This conference brought together diverse voices to explore these themes and promote resilient and sustainable development.

Key topics included architecture and the city, with emphasis on urban form, housing typologies, and the role of cultural heritage in modern urban design; urban mobility, addressing traffic challenges, public transport, and the use of technologies like GIS and AI in planning; and new housing models, focusing on affordability, energy efficiency, and innovative materials.

Discussions also covered demography and economy, exploring territorial governance, smart cities, social enterprises, and digital technologies such as AI, VR, and the Metaverse in urban management. Finally, the urban and natural environment was addressed through topics like pollution, adaptive planning, and nature-based solutions for climate resilience.

Through this conference, POLIS University and the Academy of Sciences of Albania aimed to foster a broad interdisciplinary debate on these pressing issues, combining academic and practical perspectives to offer concrete recommendations for future urban and territorial development policies and projects.

Organizers' Announcement

The International Scientific Conference on Housing, Urban Planning, and Resilient Territorial Development: Toward Euro-Mediterranean Approaches was held on October 16th-17th, 2025, in Tirana, Albania. Organized by POLIS University in collaboration with the Academy of Sciences of Albania and supported by national and international partners, including the University of Ferrara and Co-PLAN, Institute for Habitat Development, the event brought together researchers, academics, policymakers, and professionals to address key challenges in urban development, with a focus on resilience and sustainability in the Euro-Mediterranean region. The first day of the conference took place at the Academy of Sciences, while the second day was hosted at POLIS University.

The conference explored five main themes:

I. Architecture and the City, which investigated the typological and morphological dimensions of urban form, the evolution of collective and individual housing types, the relationship between architectural design and urban identity, and the role of historical and cultural heritage in shaping contemporary cities;
II. Urban Mobility and Resilient Cities, which addressed traffic congestion, infrastructure challenges, and public transportation, while also promoting the redesign of public spaces – such as streets, squares, and pedestrian zones – to improve accessibility and mobility; it also explored the integration of digital technologies like GIS, AI, and simulation tools to enhance planning, automation, and infrastructure management;
III. New Housing Models, which examined innovative approaches to affordable and social housing in response to demographic shifts and technological change, along with energy efficiency strategies, passive energy systems, and the application of new sustainable materials and construction technologies;
IV. Demography and Economy, which focused on macro-regional and national dynamics impacting territorial development, including urban governance, disaster risk reduction, and the rise of smart and inclusive cities; it also explored how emerging technologies – such as AI, VR, and the Metaverse – along with social enterprises and circular economy practices, could foster more equitable and adaptive urban systems; and
V. Urban and Natural Environment, which analyzed environmental degradation in urban settings, including air, water, and soil pollution, and promoted nature-based solutions, ecosystem-based planning, and adaptive strategies to enhance environmental sustainability and climate resilience.

The conference was conducted in English and Albanian (with self-translated texts where applicable) and was free of charge, with all registration fees fully covered by POLIS University in support of open academic exchange. Key deadlines included abstract submission by June 15th, acceptance notification by June 30th, first draft of papers by September 15th, and final submissions by October 31st.

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Albania Forest Futures: Rethinking Forests as Ecological Infrastructure for Sustainable Industrial Development

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Abstract

Albania possesses significant forest resources, yet its forestry sector is underdeveloped in terms of industrial capacity, certification, and market integration. As Albania faces major infrastructural and urban development and prepares for deeper alignment with EU environmental law during the accession process, there is an opportunity to reframe forests as ***ecological infrastructure*** *– multi-functional assets that provide carbon storage, ecosystem services and renewable materials for construction. This comparative study examines Albania's forestry profile alongside three European cases – Austria, Slovenia, and Bosnia and Herzegovina – chosen for their illustrative governance, certification trajectories, and industrial outcomes. Using harmonized indicators (forest cover, growing stock and sustainable yield, public management share, industry maturity, timber use in public infrastructure, export share, forestry revenues per capita, and CO_2 emissions per capita), the paper identifies transferable lessons and proposes a set of short-, medium- and long-term policy interventions for Albania. The study finds that certification programs, pilot mass-timber investments, and public procurement can be combined to activate Albania's timber potential while safeguarding ecological functions.*

Keywords

Ecological infrastructure, forest governance, sustainable forestry, territorial planning, urban resilience

1. Introduction

Forests are a central component of Albania's environmental endowment. Although national forest cover falls below the European Union average, the country's diverse climatic zones support a varied and potentially more resilient forest composition.[1,2] In the absence of population growth pressures, Albania is well-positioned to expand and optimize its forest areas, while developing management systems capable of sustaining a small yet modern timber industry for both domestic construction and export markets. The pursuit of EU accession in the coming decade may further enable this trajectory through access to funding, technical expertise, and mechanisms for forest certification, sustainable management, and integration of engineered wood production.[3] Nonetheless, persistent challenges – including illegal logging, limited professional capacity, and the need to develop new markets – necessitate a critical examination of external models that could be selectively adapted to the Albanian context (European Environment Agency, 2015).

The international construction sector has experienced rapid growth in timber-based systems over the past two decades, including the completion of high-rise buildings. Rising concerns over the carbon intensity of conventional construction, combined with advances in sustainable forestry practices and engineered timber technologies such as Cross-Laminated Timber (CLT) and Glue-Laminated Timber (Glulam), have expanded the range of building types feasible in wood and enabled significant emission reductions. Most realized projects, however, employ hybrid rather than all-timber systems (Svatoš-Ražnjević et al., 2022). This incremental approach demonstrates that timber can be integrated gradually, allowing Albania to strengthen its forest-based construction sector without requiring a complete, immediate transition.

Hybrid systems provide a pragmatic pathway toward increased timber use, emission reductions, and alignment with European sustainability standards.

The Balkan region offers precedent through long-standing traditions of timber construction in vernacular architecture and crafts. In several countries, these traditions have supported the modernization of forest governance and industry. Drawing on such heritage in contemporary innovation situates timber architecture not as a nostalgic practice but as a contextually grounded and globally relevant approach (Çaushi et al., 2015). In an era defined by ecological awareness, resilience, and culturally embedded sustainability, regional timber practices continue to inform modern applications.

Against this background, this paper examines whether Austria, North Macedonia, Bosnia and Herzegovina, and Romania provide instructive models for Albania in developing an independent, sustainable wood industry integrated with ecological infrastructure. With the exception of Austria, these cases were selected for their trajectories as post-socialist states with legacies of centralized

[1] Mehmet Meta, Forests and Forest Policy in Albania, *Journal of Forestry*, Volume 91, Issue 6, June 1993, Pages 27–28.
[2] World Bank. (n.d.). Forest area (% of land area) – Albania. World Bank Data. https://data.worldbank.org/indicator/AG.LND.FRST.ZS?locations=AL.
[3] World Bank. (2025, February 12). *World Bank approves $120 million loan to boost Albania's resilience and green development*. https://www.worldbank.org/en/news/press-release/2025/02/12/world-bank-approves-120-million-loan-to- boost-albania-s-resilience-and-green-development.

planning and state ownership, now undergoing varying degrees of privatization and EU alignment. Austria serves less as a directly transferable model and more as a benchmark for a fully developed forest-products industry. The objectives of this paper are threefold: (1) to outline Albania's current forestry profile, with particular emphasis on forest stock and governance; (2) to compare key indicators across the four reference cases; and (3) to derive policy recommendations and pilot project proposals relevant to Albania's EU accession trajectory.

2. Literature review & conceptual framing

This analysis draws primarily on two strands of research. The first examines forest policy, ownership, and management, highlighting how governance structures, certification schemes (FSC/PEFC), and public- and private-sector reforms shape the development of domestic wood industries, including the role of donor- supported initiatives in expanding market access. The second focuses on advances in engineered wood technologies, such as Cross-Laminated Timber (CLT) and Glue-Laminated Timber (Glulam), and their increasing use in diverse building types, illustrating how technological progress enables broader adoption of timber construction. Empirical cases illustrate these dynamics: Austria represents a mature, certified wood sector, while Romania, North Macedonia, and Bosnia and Herzegovina show how post-socialist transitions, institutional development, and targeted certification initiatives influence industrial outcomes. This framework underpins the comparative analysis presented below.

3. Methodology

This study employs a comparative case study approach, integrating quantitative and qualitative indicators to identify forest management and engineered wood industry policies relevant for Albania. Five countries were included: Albania, North Macedonia, Bosnia and Herzegovina, Romania, and Austria. Austria serves as a benchmark for a mature EU forest products industry, while North Macedonia, Bosnia and Herzegovina, and Romania illustrate post-socialist transitions in forest governance, privatization, and alignment with EU standards. Albania provides a reference for current national forest conditions, with 36.6% of land forested but experiencing ongoing degradation and negative net annual growth.

Data sources include national forest inventories (FAO/FRA), regional datasets (EEA/FISE), market and trade statistics (Eurostat, UNECE), and project documentation (World Bank, FSC/PEFC). Where multiple estimates exist – such as forest area or growing stock – values were harmonized, ranges noted, and sources cited.

Indicators include forest area, total growing stock, sustainable yield, forest productivity, net annual increment, share of public management, engineered wood industry maturity, forestry sector revenue, carbon emissions, FSC and PEFC certification.

4. Results – country profiles

4.1. Romania

Romania's forestland currently covers 7.038 million hectares, representing 29.6% of the national territory, of which 6.93 million hectares are classified as "lands covered by trees." Forests are predominantly located in the mountainous and hilly regions, with European beech (*Fagus sylvatica* L.) comprising over 30% of total forest area, followed by oaks (16%) and conifers, dominated by Norway spruce (*Picea abies* L. Karst) at 20%.

Historically, most forests were state-owned during the communist period, and public ownership remains prevalent today, accounting for 65.9% of forestland in 2018, held by the state and local administrative units. Private forests are highly fragmented, divided among approximately 750,000 owners, 4,000 associations, and 4,000 legal entities.[4]

Romania's forest policy is structured around a strict functional zoning system that prioritizes protection. Since 1954, forests have been divided into two groups: Group I, dedicated to protection functions, and Group II, combining production and protection. Group I now covers 66% of forestland, with sub-groups focused on water, soil, climate, social, scientific, and biodiversity protection. Natura 2000 sites, virgin forests, and UNESCO reserves represent particularly important conservation areas. At a finer scale, 87 functional categories and six functional types regulate management intensity, ranging from no intervention (TI) to full silvicultural use (TVI), emphasizing ecological conservation over timber production (Nicolescu, 2022).

Romanian forests contain a total standing volume of 2.35 billion m^3, averaging 340 m^3 per hectare, and exhibit one of Europe's highest annual growth rates at 8.46 m^3/ha/year. Despite a total annual increment approaching 59 million m^3, the legally allowable cut is limited to 23 million m^3 due to uneven age-class distribution and limited accessibility. Actual wood removals since 1989 have averaged approximately 15 million m^3 per year, well below the allowable level.

Forest management is strictly regulated through mandatory, state-approved Forest Management Plans, leaving owners – public or private – with little influence over silvicultural practices. High management costs, strict regulations, low profitability, and the absence of compensatory incentives place considerable pressure on smallholders. Following restitution, weak law enforcement contributed to suboptimal practices and large-scale illegal logging, although such activities have decreased in recent years (Stancioiu, 2022). The sector continues to face challenges from outdated equipment, low productivity, labor shortages, and rising costs. Nonetheless, forestry and wood harvesting remain a significant contributor, accounting for around 2% of Romania's GDP. Romania begun FSC certification in 2003, and had in 2020 2,82 million hectares of certified forest, 40% of its total forest area.[5] PEFC certification covers 653,612 hectares.[6]

[4] Ministerul Apelor și Pădurilor. (2018). *Raport privind starea pădurilor României în anul 2017 [Report on the state of Romanian forests in 2017]*. București, Romania.
[5] Forest Stewardship Council. (2020, February 17). *Facts & figures*. https://fsc.org/sites/default/files/2020-02/Facts_and_Figures_2020-02-17.pdf.
[6] Programme for the Endorsement of Forest Certification, *PEFC global statistics: Data June 2024*, PEFC International, https://www.pefc.org/resources/pefc-global-statistics.

4.2. North Macedonia

North Macedonia's forestland currently covers 1.160 million hectares, representing 44.4% of the national territory, of which 1.049 million hectares are classified as "forested areas." Forests are dominated by broad-leaved species, which cover about 61% of total forest area, with oaks (31%) and European beech (24%) as the main species. Coniferous forests account for roughly 7%, primarily black pine (4.6%), and mixed forests make up around 28% of the total (2014 figures) (State Statistical Office of the Republic of North Macedonia, 2015). Vegetation varies with altitude: lowlands and lower mountain slopes are dominated by forests of Carpinus orientalis and Quercus coccifera mixed with shrubs; the middle mountain belt (600-1,500 m) is covered by beech and deciduous oak forests, while above this zone coniferous forests emerge.

Forests in North Macedonia are predominantly state-owned (88.9%), with private forests accounting for 11.1%. Both public and private forests are required to follow management plans prepared by the Sector for Forest Management and Design within the Public Enterprise (PE) "Makedonski Shumi", which is responsible for planting, silvicultural operations, and timber harvesting (Gorgievska & Naumova-Mihajlovska, 2022). The total growing stock was estimated at 80.16 million m^3 in 2018, with an average of 77.1 m^3 per hectare. The forestry and wood processing sector contributes approximately 2.5-3% of GDP, but logging and wood processing are below optimal levels due to geographic constraints, low forest productivity, poor wood quality in low forests, and difficult alpine terrain (Berezjuk et al., 2021).

The Public Enterprise "Makedonski Shumi" faces major challenges, including outdated equipment, poor forest roads, inadequate planning, and a monopolistic market position. The network of forest roads is largely soft-surfaced (6,301 km softroads vs. 1,972 km solid roads), limiting accessibility and increasing costs, particularly in winter. Illegal logging, forest fires, natural disasters, and biotic pests also impose significant economic losses, though illegal logging has decreased in recent years due to strengthened forest guard enforcement. Despite PEFC certification and monitoring improvements, insufficient processing capacity for industrial roundwood further constrains the sector. FSC levels remain low, with only 31 companies currently producing of selling FSC-certified products. The country recently began PEFC certification, with 1600 hectares listed in 2024.[7]

4.3. Bosnia and Herzegovina

Bosnia and Herzegovina's forestland currently cover 3.232 million hectares, representing 63.1% of the national territory, of which 2.905 million hectares are classified as "forest cover" (Mataruga et al., 2019). Forests are distributed across four ecological vegetation zones: the Pripannon, Inner Dinarides, Transitional Illyrian-Moesiac, and Mediterranean areas, with horizontal zonation and altitudinal belts shaping the spatial patterns of the main vegetation types. Mountainous areas are dominated by beech forests, mixed beech-fir, beech-fir- spruce, and subalpine beech belts.

Ownership is complex and divided among multiple entities: approximately 80% of forests are publicly owned and managed by the Federation of Bosnia and Herzegovina, the Republic of Srpska

[7] PEFC global statistics: Data June 2024.

through the public enterprise Šume Republike Srpske, Brčko District, and institutions responsible for protected areas, while around 20% are privately owned.

Total growing stock is estimated between 307 and 392 million m³, yielding an average of 95–120 m³ per hectare, though figures vary across sources. Data on illegal logging is also inconsistent, with official statistics reporting an average of around 93,000 m³ annually in 2014-2018, while independent assessments suggest the real figure may exceed 1 million m³ per year.

The forestry and wood-processing sector, known for its furniture making, is a significant contributor to the national economy, accounting for approximately 10% of GDP, and Bosnia and Herzegovina is a net exporter of primary and secondary forest products. As of 2015, it was argued that one third of the forest stock held FSC FM or COC certification (Foreign Investment Promotion Agency of Bosnia and Herzegovina, 2015). While this data is somewhat hard to verify, the FSC counts 2 million hectares, around 62% as certified forests, with 350 companies that produce or sell FSC-certified products. PEFC is not listed.

4.4. Austria

Austria's forests cover 4,015,000 hectares, representing 47.9% of the national territory, and the wooded area continues to expand by an average of six hectares per day, mainly in the alpine regions of western Austria through reforestation and natural regeneration (Lackner et al., 2023). Conifers dominate the composition, with spruce accounting for 46% and beech for 10%, alongside firs, pines, and oaks.

Forest management has a long tradition, anchored in the Forestry Act of 1975, which requires regeneration and sustainable yield. About 82% of forests are privately owned, with the remainder held by the state, provinces, municipalities, and Austrian Federal Forests (ÖBf AG). Ownership is relatively consolidated, supported by cooperatives and associations that facilitate effective management and marketing. Policy is guided by the Austrian Forest Strategy 2020+ and EU frameworks, prioritizing multifunctionality and balancing production, biodiversity, climate protection, and recreation.

Austria's forests contain 1.18 billion m³ of standing volume, averaging 350 m³ per hectare, with nearly half in trees over 40 cm in diameter. The annual increment is 30.4 million m³, or 9 m³ per hectare, while the harvest rate is 25.9 million m³, or 7.7 m³ per hectare, ensuring continuous growth (Jandl et al., 2018). Certification is nearly universal: by June 2024, 3.38 million hectares were PEFC-certified, along with 568 chain-of-custody certificates.[8]

Austria is presented here not as a directly applicable case for Albania, but as a higher benchmark. It illustrates how strong governance, cooperative ownership, and near-universal certification can sustain ecological resilience and support a competitive bioeconomy.

[8] PEFC global statistics: Data June 2024.

Comparative table

Indicator	Albania	North Macedonia	Bosnia & Herzegovina	Romania	Austria
Forest area (% of total land)	36.6% (~1.05 million ha); 91.2% natural, 8.8% plantations	44.4%	63.1%	29.6%	47.9%
Total growing stock (m^3)	54.06 million	80.16 million	307–392 million	2.35 billion	1.18 billion
Sustainable annual yield (m^3/year)	NA	NA	9 million	59 million	30.4 million
Forest productivity (m^3/ha total stock)	53	77.1	95–120	340	350
Net annual forest increment (m^3/ha/year)	NA / negative; losses: 1990–2010 ≈ 650 ha/year, 2001-2021 ≈ 6.5% tree cover lost, 2023: 2,200 ha lost	NA	3.1	8.46	9
Share of forest area managed by public agencies	97%	88.9%	~80%	65.9%	18% (82% private)
Condition/maturity of engineered wood industry	Emerging; limited engineered wood production	Developing; limited capacity for engineered wood	Developing; some engineered wood production	Developing; growing engineered wood sector	Mature; advanced engineered wood sector, high-value products
Forestry sector revenue per	NA	2.5–3% of GDP	~10% of GDP	~2% of GDP	1.8% of GDP

capita/value-added					
Carbon emissions per	1.59	4.53	6.81	4.03	6.75

Indicator	Albania	North Macedonia	Bosnia & Herzegovina	Romania	Austria
capita (tCO_2e)					
FSC-certified area (% of forest)	NA	Low; 31 companies	~62%	40%	Minor (not specified)
PEFC-certified area (% of forest)	NA	0.14%	NA	9%	Nearly universal (~84%)

5. Discussion

Scale and productivity

Austria combines high forest cover (47.9%) and growing stock per hectare (350 m^3/ha) with a mature engineered wood sector. Romania also shows high productivity (340 m^3/ha).

Albania's forests (36.6% of land; 53 m^3/ha) are less productive overall, but localized high-stock zones indicate potential for pilot mass-timber operations if governance and legal frameworks are strengthened (Albania NFI; EEA).

Public ownership as an advantage

Albania's 97% publicly managed forests facilitate transparent chain- of-custody systems. Private owners are generally less likely to adopt certification, making public control a strategic benefit. Bosnia demonstrates that donor-supported reforms can certify large state-managed blocks, improving market credibility and reducing illegal logging (FAO; World Bank).

Certification and market creation

PEFC or FSC certification is essential for EU and global markets. Targeted pilot landscapes could formalize timber supply, address illegal logging, and link public-forest output to engineered wood demand. Neighboring countries currently produce limited engineered wood, suggesting potential regional markets.

Value chain and climate co-benefits

Aligning certified supply with domestic building industries and demonstration projects can avoid stranded capacity while promoting CO_2 mitigation. Albania's low per- capita emissions (1.59 tCO_2e)

mean substituting steel and concrete with sustainably sourced timber can yield climate and rural economic gains (Forest Europe; national NDCs).

Albania's potential lies in certification, high public ownership, and integration with domestic and regional markets to develop an emerging engineered wood sector.

6. Conclusion and recommendations

Albania's forests are an underutilized ecological and economic resource. Lessons from Austria, Slovenia, and Bosnia show that sequenced reforms – cadastre/legal clarity, targeted certification, modest value- chain investment, and demand creation through public procurement – can foster a resilient engineered wood sector and support alignment with EU standards, aiding Albania's EU accession process. Such an approach would also strengthen the connection between the rapidly changing Albanian built environment and local identity, while positioning Albania as a contributor in global conversations on low- carbon, resilient architecture and timber engineering.

6.1. Recommendations

Short term (0-2 years): Launch cadastre and chain-of-custody pilots; conduct CLT/glulam feasibility studies, potentially funded by EU or UNDP programs.

Medium term (2-5 years): Implement FSC/PEFC certification on pilot landscapes, link certified supply to public demonstration projects, and upgrade sawmills for engineered wood production with technical assistance and external financing.

Long term (5+ years): Integrate forestry into climate strategies with MRV and carbon-finance mechanisms.

Next steps: Harmonize Albania's NFI data, model economic and carbon outcomes, and design donor- supported programs to implement cadastre, certification, and pilot procurement sequences.

References

Albania Forestry Sector Study. (2021). *Forestry sector study report: National NFI summary and analysis*. bujqesia.gov.al

Berezjuk, R., Javůrek, M., Šafařík, D., Stankevik Shumanska, M., & Zlateski, G. (2021). Analysis of wood removals and consumption in North Macedonia in the period 2015–2020. *International Journal – Wood, Design & Technology, 10*(1), 40-51.

Çaushi, E., Marku, P., & Lato, E. (2015). Development of wood processing and furniture manufacturing sector in Albania and the Western Balkans. International Journal – Wood, Design & Technology, 4(1), 9–20.

European Environment Agency. (2015). State of the environment in Albania. https://www.eea.europa.eu/soer/2015/countries/albania

European Environment Agency. (n.d.). *Forest information system – Country pages: Albania, Austria, Slovenia, Bosnia and Herzegovina*. forest.eea.europa.eu+3forest.eea.europa.eu+3forest.eea.europa.eu+3

Eurostat. (2022). *Wood products – Production and trade*. Statistics Explained. European Commission. European Commission

Food and Agriculture Organization of the United Nations (FAO). (2020). *Global forest resources assessment 2020*. Rome, Italy: FAO. Open Knowledge FAOFAOHome

Foreign Investment Promotion Agency of Bosnia and Herzegovina. (2015). *Bosnia and Herzegovina forestry and wood industry*.

Forest Europe. (2020). *State of Europe's forests 2020*. Oslo, Norway: Forest Europe. foresteurope.org

Forest Stewardship Council. (2020, February 17). *Facts & figures*. https://fsc.org/sites/default/files/2020-02/Facts_and_Figures_2020-02-17.pdf

Global Forest Watch. (n.d.). *Albania: Forest change & deforestation rates*. Global Forest Watch

Gorgievska, K., & Naumova-Mihajlovska, K. H. (2022). Sustainable forest management in the Republic of North Macedonia: Conditions and possibilities. *Economic Development / Ekonomiski Razvoj, 24*(1), 133-148.

Jandl, R., Ledermann, T., Kindermann, G., Freudenschuss, A., Gschwantner, T., & Weiss, P. (2018). Strategies for climate-smart forest management in Austria. *Forests, 9*(10), 592. https://doi.org/10.3390/f9100592

Lackner, C., Schreck, M., & Walli, A.-M. (2023). *Austrian Forest Report 2023: We take care of the forest*. Federal Ministry of Agriculture, Forestry, Regions and Water Management. https://www.bmluk.gv.at/dam/jcr:19b66d46-f3e6-4026-9aaa-b43e3da574e5/Austrian_Forestreport2023_Einzelseite_web23nov2023.pdf

Mataruga, M., Ballian, D., Terzić, R., Daničić, V., & Cvjetković, B. (2019). State of forests in Bosnia and Herzegovina: Ecological and vegetation distribution, management and genetic variability. In M. Šijačić-Nikolić, J. Milovanović, & M. Nonić (Eds.), *Forests of Southeast Europe under a changing climate* (Advances in Global Change Research, Vol. 65, pp. 3-25). Springer.

Meta, M. (1993). Forests and forest policy in Albania. *Journal of Forestry, 91*(6), 27–28.

Ministerul Apelor și Pădurilor. (2018). *Raport privind starea pădurilor României în anul 2017* [Report on the state of Romanian forests in 2017]. Bucharest, Romania.

Nicolescu, V.-N. (2022). Romanian forests and forestry: An overview. In *Plan B for Romania's forests and society* (pp. 39–48). Universitatea Transilvania din Brașov.

Programme for the Endorsement of Forest Certification. (2024, June). *PEFC global statistics*. PEFC International. https://www.pefc.org/resources/pefc-global-statistics

Stancioiu, P. T. (2022). *Biodiversity Conservation in Forest Management.* In *Plan B for Romania's Forests and Society* (pp. 49–64). Universitatea "Transilvania," Brașov, Romania.

State Statistical Office of the Republic of North Macedonia. (2015). *Forestry 2014: Statistical review* (29 pp.). http://makstat.stat.gov.mk/PXWeb/pxweb/en

Svatoš-Ražnjević, H., Orozco, L., & Menges, A. (2022). Advanced Timber Construction Industry: A Review of 350 Multi- Storey Timber Projects from 2000–2021. Buildings, 12(4), 404. https://doi.org/10.3390/buildings12040404

United Nations Economic Commission for Europe & Food and Agriculture Organization of the United Nations. (2021). *Forest products annual market review 2020–2021*. Geneva, Switzerland: UNECE/FAO. UNECE

World Bank. (2025, February 12). *World Bank approves $120 million loan to boost Albania's resilience and green development*. https://www.worldbank.org/en/news/press-release/2025/02/12/world-bank-approves-120-million-loan-to- boost-albania-s-resilience-and-green-development

World Bank. (n.d.). *Forest area (% of land area) – Albania*. World Bank Data. Retrieved from https://data.worldbank.org/indicator/AG.LND.FRST.ZS?locations=AL