

Study

“Economic Assessment and Development Scenarios for the Balanced Growth Potential of Latvia’s Forestry Sector”

EXECUTIVE SUMMARY

Abstract. The study “Economic Assessment and Development Scenarios for the Balanced Growth Potential of Latvia’s Forestry Sector” evaluates four forest land stratification models by integrating economic, ecological, biodiversity, and socio-economic dimensions (including NPV analysis, CO₂ sequestration modeling, Pareto optimization, Leontief input–output analysis, and equilibrium efficiency curves) and combining them with expert consultations ($n > 50$) and a nationally representative public survey ($n = 1004$).

Results demonstrate that flexible stratification models substantially outperform the fixed “70–20–10” proportional framework in overall efficiency. The scenario combining intensive forestry with afforestation yields the highest gross value added—EUR 1.039 billion—with an economy-wide multiplier effect of EUR 1.148 billion and the largest CO₂ sequestration potential. In contrast, a large-scale Green Deal scenario without compensatory mechanisms would result in losses amounting to several hundred million euros.

The monetization of ecosystem services (with an estimated income potential exceeding EUR 1.2 billion) and productivity growth (+11% by 2050) represent critical levers for sustainable development. When coupled with technological advancement and regulatory harmonization with EU standards, these levers could secure Latvia’s long-term competitiveness and the preservation of its natural capital for future generations.

Keywords: Forestry Sector Economic Impact Modelling; Ecosystem Services Multiplier Effect; Cross-Sectoral Flows of Natural Capital.

Research Objective. The primary objective of the study is to assess how different forest land stratification and forestry development scenarios influence public welfare by accounting for ecological value, biodiversity, economic return, carbon sequestration, recreational and cultural benefits, as well as public trust in forest policy. The study specifically examines whether a fixed territorial distribution—such as the conceptually debated “70–20–10” proportional framework—can provide an optimal balance between diverse societal interests and the multifunctional roles of forests.

Core Task. To identify a balanced stratification model that maximizes public benefit while maintaining equilibrium among competing policy and sectoral objectives.

Methodology. The research employs an integrated four-dimensional assessment framework encompassing financial, ecological, biodiversity, and socio-economic value dimensions. This approach ensures a comprehensive evaluation of the potential impacts of alternative forestry development scenarios. The analytical framework combines: (1) **Quantitative Modelling:** Net Present Value (NPV) analysis, carbon sequestration modelling, Pareto optimization, stratification quadrant analysis, and related methods. (2) **Expert Evaluation:** Input from over 50 experts representing a broad spectrum of industry and policy perspectives. (3) **Public Opinion Research:** A statistically representative survey ($n = 1004$) capturing societal values and priorities regarding forest management and policy.

This multi-layered evidence-based approach enables a holistic evaluation of each scenario’s contribution to public welfare by integrating economic, ecological, and social perspectives into a unified analytical framework.

The study constructs and examines four hypothetical development scenarios that differ in their strategic priorities and land-use stratification logic. Each scenario embodies a distinct balance between economic productivity, ecological integrity, and social value creation.

Scenario	Description
IKD/BMF – Baseline Management Framework (<i>Ikdienišķās apsaimniekošanas scenārijs IKD</i>)	Maintains the current management approach, characterized by moderate economic activity and limited structural adjustments in land stratification. It represents lower management intensity, moderate economic returns, and constrained carbon sequestration potential.
ZD/GD – Green Deal Scenario (<i>Zaļā darījuma scenārijs ZD</i>)	Prioritizes biodiversity conservation and minimal anthropogenic impact. It entails a substantial reduction in commercial forestry operations, high ecological and intrinsic natural values, but correspondingly low economic output.
IM/ IF – Intensive Forestry Scenario (<i>Intensīvās mežsaimniecības scenārijs IM</i>)	Promotes enhanced management intensity within designated production zones using traditional species. The model anticipates increased productivity and moderate carbon capture, though with limited recreational and cultural service value.
IMA/IFA – Intensive Forestry with Afforestation Scenario (<i>Intensīvā mežsaimniecība ar apmežošanu IMA</i>)	Builds upon the IF scenario by integrating additional afforestation efforts on new land areas to expand carbon sequestration capacity and total output. This scenario delivers the highest projected economic returns and the strongest performance in carbon capture efficiency.

KEY FINDINGS

SECTORAL DEVELOPMENT – CRITICAL GROWTH LEVERS

1. **Stable Economic Role but Limited Growth Momentum.** The forestry sector accounts for **6.8% of Latvia’s GDP**, contributing substantially to exports and regional employment. However, value creation per hectare and per cubic meter remains lower than in the Nordic and Central European benchmarks. Over the past decade, the sector’s growth rate has been significantly below its structural potential.
2. **Stagnation and Decline in Productivity.** Until 2020, labour productivity exhibited steady growth, but recent data indicate a decline in both harvested area and wood volume per employee. This trend points to underlying structural inefficiencies that cannot be remedied through short-term measures alone.
3. **Resource Utilization Near the Regeneration Threshold.** Latvia’s ratio of wood extraction to net increment ranks among the highest in the European Union, signalling sustainability risks and the urgent need for a more precise balance between harvesting intensity and forest regeneration policies.
4. **Technological Capacity Deficit Constrains Value Creation.** The sector lacks sufficient capital-intensive and high-technology processing capacities—such as chemical conversion and biomaterials manufacturing—that in other countries drive significantly higher value added per cubic meter of timber.
5. **High Labor Intensity and Low Automation.** Employment per 1,000 hectares of forest is notably higher in Latvia than in the Nordic region, indicating lower automation and, consequently, higher long-term production costs. This structural feature limits competitiveness in high-wage environments.

6. **Wage Disparities and Regional Inequality.** While the sector’s average wage exceeds the national mean, remuneration in Latgale remains markedly lower, reflecting uneven investment attraction and productivity growth across regions.
7. **Limited Value-Chain Integration.** Despite growth in forest harvesting employment, there has been no proportional increase in wood processing or furniture manufacturing. This highlights weak vertical integration and insufficient synergy between forestry and downstream industries, reducing overall value creation potential.
8. **Low Growth in Standing Timber Stock Restrains Long-Term Potential.** Latvia’s increase in standing timber volume lags that of many EU countries, constraining both future resource availability and carbon sequestration capacity—factors of growing importance in international climate and carbon markets.
9. **Risk of Overharvesting and Insufficient Regeneration.** Persistently high harvesting levels, if not offset by adequate reforestation and modern silvicultural practices, pose the risk of diminishing the forest’s capacity to sustain current production volumes and competitiveness over time.
10. **Need for Structural Transition Toward Higher Value-Added Models.** Latvia’s long-term competitiveness will depend on its ability to shift from raw material export toward an **innovation-driven product portfolio**—including engineered wood construction materials, bioenergy, bioplastics, and biochemicals—that ensures higher profitability and greater resilience to raw material price volatility.

KEY INSIGHTS FROM SCENARIO ANALYSIS FOR STRATEGIC DECISION-MAKING

1. **Optimized Stratification Significantly Increases Overall Societal Benefit.** A rigid “70–20–10” proportional framework without regional adaptation reduces the *Net Present Value (NPV)* by several hundred million euros compared to a flexible, data-driven stratification model. Modeling results demonstrate that optimized stratification can simultaneously enhance both economic returns and carbon sequestration, effectively moving the equilibrium efficiency curve toward its optimal point.
2. **Intensive Forestry with Afforestation as the Leading Scenario in Economic Contribution.** This scenario generates **EUR 1.039 billion** in gross value added within the forestry and wood sectors and produces a **EUR 1.148 billion** multiplier effect across the national economy—the highest among all modeled scenarios—while also delivering substantial CO₂ sequestration potential.
3. **Selective Adaptation of the Green Deal (GD) Is Essential.** Implemented on a broad scale in its current form, the GD scenario yields the lowest economic return and only moderate carbon benefits (with CO₂ sequestration markedly lower than in actively managed areas). Therefore, its implementation requires a selective, data-driven approach accompanied by compensation mechanisms for landowners; otherwise, potential societal losses could amount to hundreds of millions of euros.
4. **Ecosystem Service Monetization as a New Revenue Pillar.** The full-scale introduction of carbon credit systems, biodiversity payments, and natural capital accounting could generate additional sectoral income exceeding **EUR 1.2 billion**, diversifying the economic base beyond traditional timber utilization and increasing investment attractiveness.
5. **Productivity Growth Potential in Managed Zones.** Scientifically grounded cultivation of high-yield tree species (such as hybrid aspen, fast-growing spruce, and pine), combined with the adoption of precision forestry technologies, could raise economic performance by **+11%** under the intensive forestry with afforestation scenario and by **+4%** under the intensive forestry scenario by 2050.
6. **Functional Concentration to Mitigate Conflicts.** Concentrating nature conservation and recreational functions within approximately **30% of the territory** reduces structural conflicts between ecological and economic objectives, while enabling higher productivity and greater flexibility in achieving sustainability targets across remaining areas.
7. **Focusing Recreational Values on Quality Enhancement.** Public surveys confirm strong demand for well-equipped recreational zones. Concentrating and upgrading such areas—through nature

trails, observation towers, and visitor centers—enhances social benefit per unit area and strengthens public support for forest sector policies.

8. **Integration of Technology and Innovation – From Cost Reduction to Value Creation.** Drone-based monitoring, satellite data, and AI-driven growth models improve decision-making accuracy, reduce yield losses, and create the foundation for higher value-added outcomes in biomass and wood processing industries.
9. **Integrated Sustainability Policy as the Foundation of Global Competitiveness.** The combination of sustainability policy, technological innovation, and ecosystem service monetization establishes a multidimensional value chain that simultaneously drives economic growth, advances climate objectives, and improves societal well-being.
10. **Strengthening the Regulatory Framework for Long-Term Balance.** The legal institutionalization of the “70–20–10” stratification principle—with built-in flexibility for regional adaptation—would provide a clear and investor-friendly framework, reducing policy volatility risks that currently hinder long-term capital investment in the forestry sector.

EXPERT ASSESSMENT – PRINCIPAL STRATEGIC INSIGHTS

1. **Heterogeneous Perceptions of the Balance Between Economy and Nature.** Expert opinions are markedly divided: approximately one-third perceive a balanced relationship, one-third emphasize environmental protection, and one-third prioritize economic dominance. This fragmentation reveals the absence of a unified understanding of the sector’s equilibrium point, even within a single professional community.
2. **A Fundamental Perceptual Divide Between Science and NGOs.** Representatives of environmental organizations express significantly higher criticism: among fifteen NGO experts, thirteen believe that economic interests dominate Latvian forestry, while only one perceives a balance. This underscores a profound communication and trust gap between the policy-making sphere and environmental advocacy groups.
3. **Climate Change Identified as a High-Level Strategic Risk.** Seventy-five percent of experts regard climate change as a *substantial threat* to both the ecological and economic balance of the forestry sector, emphasizing the urgent need to introduce adaptive management and risk mitigation instruments.
4. **Intensive Logging and Export Demand as Dominant Threats.** Ninety percent of experts identify these factors as *significant or critical*, highlighting the need to limit logging intensity, diversify export structures, and strengthen domestic processing capacity.
5. **Deficit of Public Engagement as a Systemic Obstacle.** Over ninety percent of experts view the public’s limited understanding and participation as the *primary barrier* to implementing sustainable forest policy, stressing the importance of a targeted national strategy for public education and engagement.
6. **Regulatory Imbalance and Lack of Compensation Mechanisms.** Seventy-five percent of experts indicate that the current regulatory framework *does not adequately promote* a balanced approach—particularly criticizing the *Natura 2000* and micro-reserve regimes for lacking effective compensation mechanisms for landowners.
7. **Public Education as the Top Strategic Priority.** Three-quarters of experts consider public education and engagement to be *highly or moderately effective* strategies, identifying them as critical levers for rebuilding trust and achieving sustainability objectives.
8. **Partial Support for Habitat Policy Instruments.** Fifty percent of experts regard clear-cutting restrictions and the establishment of ecological corridors as effective balance instruments; the remaining experts are neutral or skeptical, pointing to the need for context-sensitive adaptation of these measures.
9. **Certification Systems Viewed Positively but Without Consensus.** Approximately sixty percent of experts consider *FSC/PEFC certification* systems effective, forty percent remain neutral, and none deem them ineffective. This reflects certification’s potential as a *trust-building mechanism* while signaling the need for greater transparency and improved compliance monitoring.

10. **Polarized Views on the Design of Economic Incentives.** Expert opinions are evenly split between support and skepticism regarding payments for ecosystem services and “penalty” taxation schemes. This polarization highlights the necessity of developing precisely targeted financial instruments that reduce resistance and enhance implementation efficiency.

PUBLIC PERSPECTIVE – SOCIETAL SIGNALS AND PRIORITIES

1. **Cautious and Polarized Attitudes Toward Foreign Investors.** Only one-fifth of respondents (22.45%) view the presence of foreign investors in the forestry sector positively, while more than one-third (36.89%) express opposition. This indicates high social sensitivity and underscores the need to reconsider communication and trust-building strategies related to investment policy.
2. **Optimism About the Economic Future of Forests as a Strong Development Asset.** More than two-thirds (70.03%) of the population believe that the economic value of forest resources will increase in the future, creating a favorable foundation for attracting investment and advancing sectoral modernization.
3. **Critical Views on the Governance of State Forests.** Two-thirds of respondents (66.47%) believe that profit generation—not environmental protection—is the main management priority. This reveals the need to balance economic and ecological objectives and to foster greater transparency in decision-making processes.
4. **Broad Support for Compensation Mechanisms to Promote Sustainability.** A strong majority (71.22%) of respondents agree that the state should provide financial compensation to private landowners for maintaining areas of ecological value. This opens pathways for developing new financial instruments in the monetization of natural capital.
5. **Forests Viewed as a Strategic Pillar of Climate Policy.** An overwhelming majority (87.04%) acknowledge the essential role of forests in mitigating climate change, with 66.17% fully agreeing with this statement. This creates a robust public mandate for integrating climate policy objectives into forest management practices.
6. **High Levels of Concern About Long-Term Climate Risks.** Approximately 74.18% of respondents anticipate significant climate change impacts on forests over the next 50 years, emphasizing the need for proactive adaptation policies and resilience planning.
7. **Ecosystem Service Value as a Top Public Priority.** Carbon dioxide sequestration is identified as the most important ecosystem service by 78.34% of respondents, followed by biodiversity maintenance (69.93%). This provides a foundation for public support in developing biocapital markets.
8. **Strong Recreational and Cultural Significance of Forests.** A large share of the population (88.34%) visits forests regularly for recreation, while 64.12% do so for traditional activities such as berry and mushroom gathering. These patterns highlight the central role of forest resources in public well-being and quality of life.
9. **Public Acceptance of Sustainable Timber Utilization.** Most respondents (76.46%) agree that logging is acceptable when sustainability principles are observed. This provides a political and social foundation for a balanced resource utilization strategy.
10. **Willingness to Accept Short-Term Economic Constraints in Favor of Sustainability.** Nearly two-thirds (63.99%) of respondents support additional forestry restrictions even if they temporarily reduce economic growth. This stance affirms the preservation of long-term environmental quality as a key societal priority.

KEY RECOMMENDATIONS

Proposals for Enhancing Regulatory Frameworks and International Alignment

1. **Productivity Enhancement as an Instrument for Maximizing Public Benefit.** To achieve the highest possible societal return, productivity in the 70% of economically managed areas must be strategically increased through technological modernization and the application of scientifically

grounded intensive forestry methods—such as high-yield tree species, shorter rotation cycles, and precision silviculture. This approach enhances both economic performance and resource-use efficiency.

2. **Stratified Protection as a Mechanism for Conflict Reduction and Economic Capacity Building.** By designating up to **30% of forest areas** for nature conservation (10% under strict protection and 20% under limited-use regimes), Latvia can safeguard high-value ecological, aesthetic, and cultural assets while reducing conflicts among competing social interests. This framework simultaneously releases potential for strengthening economic activity within the remaining 70%, ensuring a sustainable balance between ecology and economy.
3. **Legal Institutionalization of the “70–20–10” Stratification Principle.** The optimal proportional division of economic, protective, and recreational zones should be codified in legislation, with embedded flexibility mechanisms and compensation for landowners. The introduction of a “*safe harbor*” principle for voluntary nature conservation would help balance constitutional requirements under **Articles 105 and 115** of the Latvian Constitution, ensuring alignment between property rights and environmental obligations.
4. **Avoiding Uncompensated Productivity Losses During Green Deal Implementation.** Restrictions envisaged under the Green Deal scenario must not be introduced without compensatory measures to maintain productivity in managed forest zones. Modeling results confirm that uncompensated productivity reduction lies outside the optimal point of the total public welfare curve, generating long-term losses in both economic and social dimensions.
5. **Integration of Ecosystem Services into Policy Frameworks.** Amend the **Forest Law** and the **Sustainable Development National Agenda (SDNA)** to mandate the monetary and qualitative valuation of carbon sequestration, biodiversity, and water regulation using internationally recognized methodologies such as **SEEA EA**, **IPCC**, and **TEEB**. Such a framework would enable holistic decision-making, mitigate climate risks, and reinforce the implementation of the **UN Sustainable Development Goals (SDGs)**.
6. **Reform of Subsidy and Market Mechanisms.** Expand rural development support programs by introducing **Payment for Ecosystem Services (PES)** schemes for private landowners. Base compensation mechanisms on **IPCC** and **TEEB** valuation methodologies, increasing subsidy intensity for sustainable practices and allocating at least **30%** of landscape program funding to these initiatives.
7. **Harmonization of Terminology and Regulation with EU Systems.** Align the terminology of the **Forest Law** and **SDNA** with the **SEEA EA** and the **EU Forest Strategy**, recognizing forests as *natural capital* rather than solely as a source of timber. Integrate **FSC/PEFC certification recognition** into state aid eligibility criteria to strengthen coherence between regulatory and market-based sustainability mechanisms.
8. **Establishment of a “Green Bioeconomy” Section under the Cluster Law.** Create a platform for cross-sectoral collaboration and innovation in forest bioeconomy, linked to **EU funding instruments** such as *Horizon Europe*, *EIT*, and *CBE JU*. The focus areas should include **CO₂ markets, digital solutions, circular economy innovations, and biotechnologies**, fostering technological upgrading and export capacity.
9. **Modernization of Monitoring Systems and Public Participation.** Integrate **drones, geospatial analytics, and satellite data** into the operations of the **State Forest Service (VMD)**. Establish a public, open-access database of all logging areas. Mandate **public consultations** for large-scale forestry projects (over 500 hectares), utilizing digital participation tools and regional hearings to ensure transparency and inclusive governance.

STRATEGIC RECOMMENDATIONS FOR THE SECTOR: INTEGRATING ECOLOGICAL, ECONOMIC, AND SOCIAL DIMENSIONS

The current regulatory and policy framework remains predominantly focused on **timber extraction**, with insufficient integration of environmental and climate-related risks. The production portfolio is dominated by **mechanically processed wood products** (such as sawn timber and boards), which are

largely exported to high-demand markets in Europe and beyond—often tailored to client specifications, thereby generating relatively higher added value. However, the development of **high value-added bioeconomy products** remains limited, underscoring the strategic importance of transitioning toward this segment. Public engagement and trust in the sector are low, and satisfaction with governance is particularly weak in regions where forests constitute a vital living environment. The regulatory landscape is **fragmented and poorly aligned** across environmental, economic, and regional development objectives.

STRATEGIC DIRECTIONS FOR TRANSFORMATION

1. **Economic Growth and Innovation.** Reorient sectoral development toward **high value-added products**—including biocomposites, biochemicals, and biorefinery-based materials. Integrate **carbon sequestration** into the economic model and strengthen participation in international CO₂ markets. Promote a **circular bioeconomy** by monetizing by-products and enhancing resource efficiency.
2. **Environmental Sustainability.** Introduce **Payment for Ecosystem Services (PES)** schemes, targeting coverage of *at least 20% of forest areas by 2028*. Develop an interconnected network of **ecological corridors** and restore degraded lands. Maintain the minimum proportion of **protected areas** while integrating **climate risk management** into forestry practices.
3. **Social Sustainability and Regional Development.** Enhance regional **employment and income levels** by supporting sustainable forestry enterprises and developing **ecotourism infrastructure**. Establish **regional innovation centers** in cooperation with higher education and research institutions. Implement targeted **public education campaigns** to increase awareness of forest multifunctionality and sustainability.
4. **Institutional Capacity and Regulatory Coherence.** Improve the **compensation system** by ensuring transparent and timely disbursement mechanisms. Harmonize **terminology and definitions** with EU and international accounting frameworks (e.g., SEEA EA). Create a regulatory foundation that clearly differentiates **intensively managed zones** from **strictly protected areas**, enabling adaptive governance.
5. **Integration of International Best Practices.** Adapt **Nordic governance models** emphasizing transparency and accountability in forest monitoring. Align Latvia’s forestry strategy with the **EU Green Deal**, the **2030 EU Forest Strategy**, and **climate neutrality objectives**. Monetize **ecosystem services** and utilize **open-access data** to strengthen public trust and policy legitimacy.

Key Target Outcomes by 2030: (1) Establish **30 new bioeconomy enterprises** in regional areas. (2) Enroll **20% of national forest areas** under PES schemes, ensuring measurable CO₂ sequestration outcomes. (3) Achieve **80% public awareness** of the importance of sustainable forestry practices.

KEY DIRECTIONS FOR ADVANCING SUSTAINABLE PRACTICES

Latvia’s forestry sector possesses several **strategic advantages**—notably, extensive forest resources, geographic proximity to major European markets, a high degree of forest cover, and strong potential to integrate sustainability practices aligned with **EU and global standards**. However, the sector’s substantial share of **low value-added exports** and the **incomplete integration of ecological factors** currently constrain its international competitiveness.

Key Directions for Advancing Sustainable Practices

1. **Technological Modernization.** Integrate advanced **digital solutions**—including drones, satellite monitoring, and geospatial analytics—alongside **precision forestry** methods to enhance productivity, transparency, and ecological efficiency.
2. **CO₂ Accounting and Carbon Markets.** Establish a **national carbon accounting system** and strengthen Latvia’s participation in **international carbon credit markets**, positioning the country as a credible contributor to global climate finance mechanisms.

3. **Biodiversity Innovation.** Implement **restoration technologies**, develop **ecological corridor networks**, and introduce **climate adaptation solutions** to safeguard biodiversity and increase ecosystem resilience.
4. **Stimulation of Green Investment.** Promote **public–private partnerships** within the **bioeconomy**, leveraging capital from the **EU Green Deal**, **climate funds**, and other sustainability-focused financing instruments to drive innovation and market transformation.

The implementation of these directions will enable Latvia to transition from a **resource-extractive economic model** to a **forestry sector founded on innovation and sustainability**—one that ensures **global competitiveness**, **economic resilience**, and the **preservation of natural capital** for future generations.

Research Conducted by University of Latvia
Completed in August 2025
© University of Latvia

This study incorporates information obtained from a range of **primary and secondary sources**, analyzed in accordance with an agreed methodological framework. The authors assume full responsibility for the **assessment of data quality**, ensuring that only methodologically sound and reliable data were included in the analytical datasets. Observations or records not meeting quality standards were excluded to maintain the **scientific integrity** of the research.

At the same time, the authors note that **responsibility for the accuracy, completeness, and representativeness of secondary-source data** rests entirely with the original data collectors and processors. Within this study, such data were used based on **criteria of availability, reliability, and methodological relevance**; however, the authors did not undertake full independent verification of the original data collection methods, sampling structures, coverage scope, or potential measurement errors.

This disclaimer is consistent with international academic practice, recognizing that the use of secondary data depends on the **credibility of the original sources**. Accordingly, any potential limitations or inaccuracies should be interpreted within this context.

The study was conducted **in collaboration with AS Latvijas Finieris**, fostering synergy between **academic research and industry** to develop **practically implementable solutions** aimed at enhancing **sustainability and global competitiveness** within Latvia’s forestry sector.

Research Team

- **Prof. Jānis Priede** – Lead Expert
 - **PhD (cand.) Mārtiņš Danusēvičs** – Senior Researcher
 - **PhD (cand.) Līga Brasliņa** – Project Leader
 - **PhD (cand.) Katrīna Kellerte** – Researcher
 - **Prof. Anda Batraga** – Expert
-

Contact Person:
Līga Brasliņa
liga.braslina@lu.lv
+371 26599481