POLICY AND GOVERNANCE DIMENSIONS OF SUSTAINABLE FOREST MANAGEMENT: A COMPARATIVE ANALYSIS OF THE REPUBLIC OF SERBIA AND ROMANIA

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Abstract

This study provides a comparative assessment of the newest policy frameworks and practical implementations of sustainable forest management (SFM) in Romania and the Republic of Serbia. Both countries share similar biogeographical conditions shaped by the Carpathian Mountains and Danube Basin but differ in institutional frameworks and levels of European Union (EU) integration. The research used a comparative, analytical, and normative approach, drawing on national forest inventories, FAO and UNECE reports, and national legislation to assess forest structure, ownership, afforestation and regeneration trends, policy implementation, and measures addressing illegal logging. The findings indicate that Romania's forest cover consists predominantly of natural high forests (94.7%), whereas in Serbia, most forest stands are classified as coppice formations (65.17%). Romania exhibits greater institutional and regulatory coherence, supported by EU mechanisms such as SUMAL 2.0 and updated forestry legislation (Law no. 331/2024), which enhance transparency and monitoring. Serbia's framework, constrained by outdated legislation (Law on Forests, 2010), limited enforcement, and weak monitoring systems, is improving through gradual policy harmonization and international projects support. Both countries continue to face challenges related to illegal logging, fragmented ownership, and low community engagement. The paper concludes that achieving sustainable progress in forestry requires adaptive policymaking, technological modernization, and stronger institutional cooperation to align national governance with European and global sustainability standards.
Key words: comparative analysis, Serbia, Sustainable Forest Management (SFM), Romania

INTRODUCTION

Serbia and Romania are situated at the intersection of Central and Southeastern Europe. Both countries exhibit a predominantly continental climate characterized by significant seasonal variability. Nevertheless, regional climatic distinctions exist: the eastern part of Romania is moderated by the influence of the Black Sea, whereas southwestern Serbia is affected by Mediterranean air masses originating from the Adriatic Sea.

In terms of forest cover and vegetation, both countries display similar patterns of forest composition and vertical zonation, reflecting their shared Carpathian ecological framework.

However, Romania's more extensive mountain ranges sustain broader areas of subalpine and alpine vegetation.

Forest areas are under pressure due to land use changes and due to the degradation of existing forests and the reduction of biodiversity. Adaptation and restoration of forests are necessary to prevent the

continued global loss of ecosystem functions and services and biodiversity, so that forest landscapes can respond to the ecological, economic and social challenges that accompany global change (Bolte et al., 2023).

A significant part of the forest fund of Serbia consists of coppice forests (65.17% of the total forest area), which is why one of the main objectives of the forestry management strategy is the reclamation of these forests (NFISRB, 2022).

Romanian forests are predominantly composed of naturally regenerated high forests, which account for 94.70% of the country's total forest area (NFIRO, 2018). According to these data, forests play a vital ecological and economic role in both countries.

This paper presents a comparative analysis of Serbia's and Romania's approaches to sustainable forest management, arguing that although both countries pursue similar sustainability objectives, Romania's status as a member of the European Union has facilitated more consistent integration and monitoring processes, whereas Serbia's progress remains limited by institutional and legislative deficiencies.

MATERIALS AND METHODS

Research is based on primary data analysis by collecting and processing scientific literature, relevant legislation, reports and studies. The primary scientific methods employed included general systems theory, analysis and synthesis, as well as normative and comparative approaches. The method of analysis and synthesis was applied to examine forestry sector legislation and draw conclusions based on the collection, processing, and review of literature concerning the organization of the forestry sector and the roles of state forest administration in both countries.

The comparative method was employed to analyze the sustainable forest management policies and practices of Serbia and Romania.

Both Serbian and Romanian forestry policies are influenced by the European

forest policy framework, considering that Romania is an EU member and Serbia is a candidate. Thus, Sustainable Forest Management (SFM) for these countries means balance between ecological, economic and social functions.

The timeframe 2020-2025 was chosen for comparative analysis as a period of increasing EU alignment and sustainability commitments.

For the purpose of comparative analysis of sustainable forest management in Serbia and Romania, the following indicators were considered: total forest area by stand origin (natural high stands, coppice stands, artificially established stands), tree species and stand type, total standing forest volume in both countries according to the above indicators, share of forests in the total forest area by ownership, restored forest area (natural and artificial regeneration), afforested areas, national forest-related legislation and regulations, as well as the data on illegal logging.

Similarities and differences in forest management in Serbia and Romania were defined, as well as the effectiveness of the implementation of the sustainable forest management system and the impact that the EU has on both countries in these aspects.

For the comparative analysis, data from the last two forest inventories in Serbia (NFISRB, 2022), and in Romania (NFIRO, 2012; 2018), data from FAO (2025a), data from the national statistical offices and ministries responsible for forestry of Serbia (MAFW, 2006; 2025; SOSRB, 2024) and Romania (MEWF, 2020), as well as other relevant domestic and foreign literature sources were considered.

RESULTS AND DISCUSSIONS

Forests cover an area of total 2,854,955.75 hectares in Serbia (NFISRB, 2022), with a total volume of 556,971,156.58 m^3 (volume increment of 194.49 m^3/ha). Naturally originated high forest stands make up 25.82% of the total forest area, coppice stands account for 65.17%, and artificially

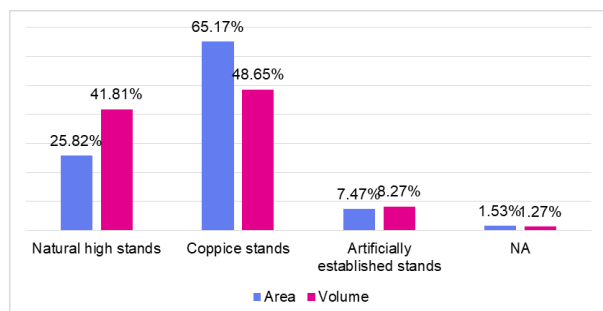established stands represent 7.47% of the total forested area (Figure 1).

Figure 1. Distribution of the percentage of area cover and volume of forests in Serbia by the origin of the stand

In Romania, forests cover a total of 7,037,606.57 hectares (NFIRO, 2018), with 3,756,426.85 hectares (53.4%) in Transylvania, 1,846,321.69 hectares (26.2%) in Wallachia, and 1,434,858.03 hectares (20.4%) in Moldavia, respectively. Land covered with trees occupies 6,929,047,448 hectares, which is 98,4% of total forest covered area. The rest is land intended for afforestation, with 56,652,659 hectares.

Stands of a natural high origin cover 94.70% of the total forest area and 98.2% of the total volume of these forests, which is 2,354,789,866,781 m^3 (average volume per hectare is 339,843 m^3/ha).

Coppice stands cover 5.3% of the total forest area and make up 1.8% of the total volume (Figure 2).

The National Forest Inventories of both countries provide the following data: in Serbia, available information presents forest area by stand category (Figure 3), while in Romania, forest area is shown by species group (Figure 4). Both figures indicate that beech forests occupy the largest share, with comparable percentages, 25.68% in Serbia (NFISRB,

022) and 30.5% in Romania (NFIRO, 2018), respectively.
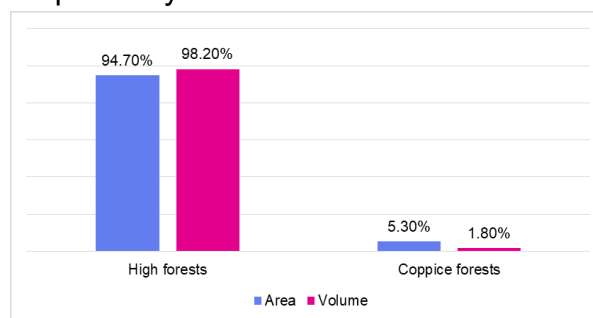

Figure 2. Distribution of the percentage of area cover and volume of forests in Romania by the origin of the stand

In Serbia, forests of oak stand categories, including pedunculate oak (*Quercus robur* L.), downy oak (*Q. pubescens* Willd.), Hungarian oak (*Q. frainetto* Ten.), sessile oak [*Q. petraea* (Matt.) Liebl.], and Turkey oak (*Q. cerris* L.) cover 30.89% of the forest area, whereas in Romania, oak forests occupy 16.3% of the forested area. Coniferous stands account for 5.22% of Serbia's forest area, which is roughly four times lower than in Romania, where they cover 24.6%, Norway spruce [*Picea abies* (L.) H. Karst.] being the main species.
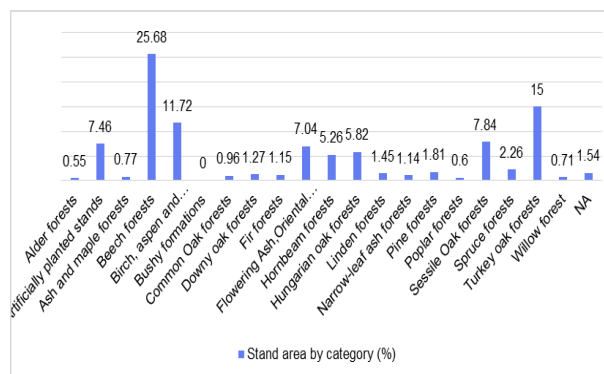

Figure 3. Distribution of the percentage of forest area cover in Serbia by stand category

According to the most recent National Forest Inventories in both countries and FAO Global Forest Resources Assessments reports (FAO, 2025a), total growing stock of both Serbia and Romania is dominated by common beech (*Fagus sylvatica* L.), with 37.71% and 37.43% respectively. In Serbia, the second most

abundant tree species in terms of growing stock is Turkey oak, comprising 12.17%, followed by sessile oak (5.88%), Norway spruce (5.71%), Hungarian oak (4.79%), hornbeam (*Carpinus betulus* L.) with 4.29%, black pine (*Pinus nigra* J.F. Arnold) with 4.05%, and silver fir (*Abies alba* Mill.) with 2.21%. Other species accounted for less than 2% from the total of Serbia's growing stock.
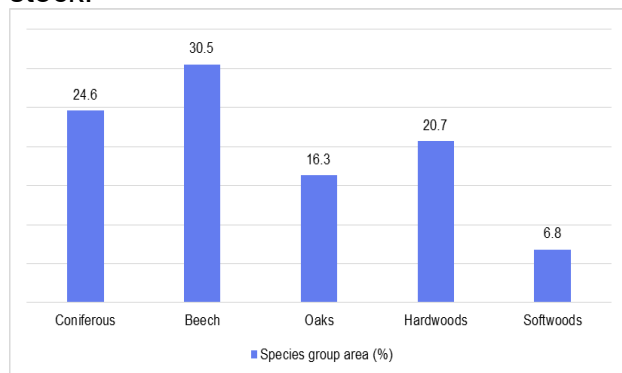

Figure 4. Distribution of the percentage of forest area cover in Romania by species group

In Romania, the tree species with the second-largest share of the growing stock is Norway spruce at 23.79%, followed by sessile oak (7.49%), silver fir (6.8%), hornbeam (4.82%), and Turkey oak (2.89%). All other tree species each account for less than 2% of the total growing stock (Table 1 and Figure 5).

What is to acknowledge from Figure 5 is that the total growing stock of the beech forests is quite similar – in Serbia 37.71% and in Romania 37.43%, respectively. The biggest difference is between the total growing stock of Norway spruce and Turkey oak in the two countries. Spruce forests cover 2.6% of Serbia's forest area (NFISRB, 2022), whereas in Romania, data from the First National Forest Inventory (NFIRO, 2012) show that spruce forests account for 22.9% of the forested area. Turkey oak forests occupy 15% of Serbia's total forest area, while in Romania, the First NFI reports

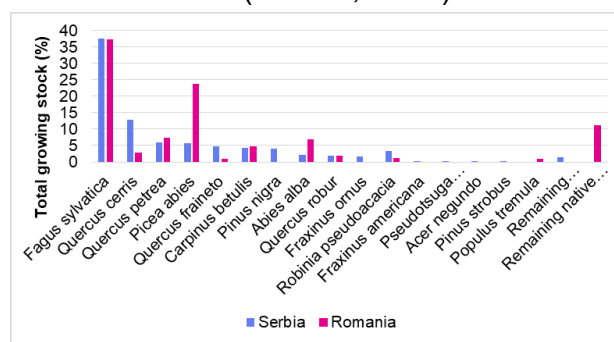261,506 hectares, representing 4.5% of the total forest area (NFIRO, 2012).

Figure 5. Total growing stock (%) distribution based on the tree species in Romania and Serbia

Forest ownership in Serbia is divided in two: state owned forests (1,191 thousand ha; 58.27%) and private owned forests (1,663 thousand ha; 41.73%) of the total of 2,854 thousand hectares (Figure 6).
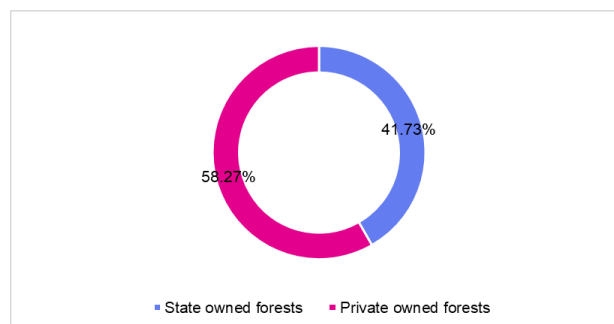
Figure 6. Distribution of Serbian forests by ownership type

In Romania, ownership is split into few categories: forests in the public property of the state (3,179 thousand ha) – 48.10%, public property of the Administrative Territorial Units (UAT, 1,061 thousand ha) – 16.10%, private property of individuals and legal entities (2,261 thousand ha) – 34.20% and private property of the UAT (103 thousand ha) or 1.60% (Figure 7), sharing the total area of 6,604 thousand hectares of forests included in the national forest fund (MEWF, 2020). The remaining 0,4 million hectares of forests are the so-called forest

vegetation located outside the forest fund, on agricultural lands.

Figure 7. Distribution of Romanian forests by ownership type

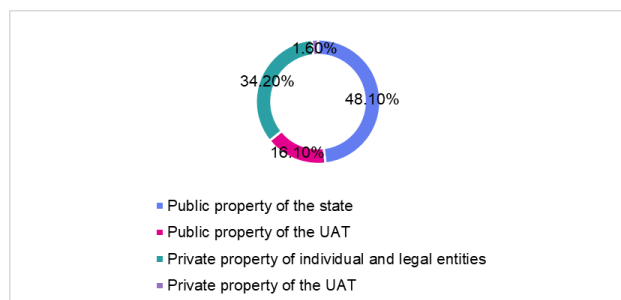In Serbia responsible ministry for forestry affairs is Ministry of Agriculture, Forestry and Water Management, the Directorate of Forests, which represents national platform for stakeholders participation in forest policy. Main law in Serbia on forests that defines the permanence and protection measures of the area under forests is the Law on Forests („The Official Gazette RS", no. 30-2010, 93/2022, 89/2015 i 95/2018 – other law). The laws that also consider affairs of forestry are The Law on Reproductive Material of Forest Trees („The Official Gazette RS", no. 135/04, 8/05 – correction, 41/09) and The Law on Game and Hunting („The Official Gazette RS", no. 18 from 26.03.2010, 95 from 08.12.2018. – other law), as well as the Nature Protection Law („The Official Gazette RS", no. 36/2009, 88/2010, 91/2010 – correction, 14/2016, 95/2018 – other law and 71/2021).

In 2025 GFRA for Serbia (FAO, 2025a) it is noted that Directorate of Forests and Serbia's forestry policies and legislation indicate the existence of policies supporting SFM, legislations and regulations supporting SFM, platform that promotes (or allows) for stakeholder participation in forest policy development and traceability system (or systems) for wood products. Serbia also has Forestry Development Strategy from 2006 that is still to date. In the Strategy it is stated that „*at this moment forestry sector of Serbia has no adopted documents that address adequately the goals of the sector development. There is an incentive to develop a document at the State level, which will reflect the trends and methods of solving the numerous issues in Serbian forestry in harmony with the sector requirements, its significance for the sustainable development of the Republic of Serbia, and the intentions to join the European Union in near future*" (MAFW, 2006).

In Romania responsible authority for forestry is Ministry of Environment, Water and Forests. Romania's policies, legislation and national platform for stakeholder participation in forest policy indicate the existence of policies supporting SFM, legislations and regulations supporting SFM, platform that promotes (or allows) for stakeholder participation in forest policy development and traceability system for wood products. The Forestry Code (Law 331/2024), The Law of Hunting (Law 407/2006), The Law of Protected Areas (Government Emergency Ordinance 57/2007), Minister's orders for Norms I-VIII, The Integrated Information System for Wood Tracking SUMAL 2.0 (Government Decision 497/2020), The Regulation for the valorization of wood mass from the publicly owned forest fund and Instructions regarding the terms, methods and periods of collection, removal and transport of the wood material (Ministerial Order 1540/2011) are among the most important regulations (FAO, 2025a).

The Integrated Information System for Wood Tracking (SUMAL), established in 2008 is carrying out wood tracking from harvesting and transportation to end users, through special regime documents in a unique numbering system, allowing precise

Table 1. Total growing stock (in million m³ and %) for main tree species in Romania and Serbia (FAO, 2025a)

Serbia				Romania			
Scientific name	Common name	Million m³	% of total	Scientific name	Common name	Million m³	% of total
Native tree species			NFI, 2022	Native tree species			NFI, 2018
Fagus sylvatica	Beech	225.38	**37.71**	*Fagus sylvatica*	Beech	881.51	**37.43**
Quercus cerris	Turkey oak	76.44	**12.79**	*Picea abies*	Norway spruce	560.16	**23.79**
Quercus petraea	Sessile oak	35.12	**5.88**	*Quercus petraea*	Sessile oak	176.31	**7.49**
Picea abies	Norway spruce	34.13	**5.71**	*Abies alba*	Silver fir	160.07	**6.80**
Quercus frainetto	Hungarian oak	28.63	**4.79**	*Carpinus betulus*	Hornbeam	113.57	**4.82**
Carpinus betulus	Hornbeam	25.64	**4.29**	*Quercus cerris*	Turkey oak	68.1	**2.89**
Pinus nigra	Black pine	24.23	**4.05**	*Quercus robur*	Pedunculate oak	42.55	**1.81**
Abies alba	Silver fir	13.18	**2.21**	*Quercus frainetto*	Hungarian oak	23.66	**1.00**
Quercus robur	Pedunculate oak	11.34	**1.9**	*Populus tremula*	European aspen	22.91	**0.97**
Fraxinus ornus	Flowering ash	9.29	**1.55**	Remaining native tree species		263.31	**11.18**
Remaining native tree species		82.61	**13.82**	TOTAL native tree species		2,312.15	**98.18**
TOTAL native tree species		**565.99**	**94.71**	Introduced tree species			
Introduced tree species				*Robinia pseudacacia*	Black locust	29.01	**1.23**
Robinia pseudoacacia	Black locust	19.71	**3.3**	Remaining introduced tree species		13.63	**0.58**
Fraxinus americana	American ash	0.84	**0.14**				
Pseudotsuga menziesii	Douglas fir	0.74	**0.12**				
Acer negundo	Boxelder	0.62	**0.1**				
Pinus strobus	Eastern white pine	0.54	**0.09**				
Remaining introduced tree species		9.16	**1.53**				
TOTAL introduced tree species		**31.61**	**5.29**	TOTAL introduced tree species		42.64	**1.81**
Total growing stock		**597.6**		Total growing stock		2,354.79	

identification of wood sourcing (FAO, 2025a). Both Serbia and Romania are Eastern European countries that experienced centrally planned economies, where natural resources were state controlled for more than four decades. In the aftermath of the post-socialist political transformations, both countries began implementing property restitution processes, in the 1990s in Romania (Scriban et al., 2016; Scriban et al., 2019)

and in the 2000s in Serbia (Nonić, 2015; Živojinović et al., 2025).

In Romania, the implementation of restitution policies, compounded by inadequate legislation and weak enforcement mechanisms, led to improper forest management practices in several regions (Andrici et al., 2017).

A further structural issue affecting sustainable forest management in both countries is the high degree of forest fragmentation into small private holdings. This trend is particularly pronounced in

Serbia, where more than 90% of private forests are smaller than 10 hectares (Bouriaud et al., 2013).

In Romania, forest properties under 10 hectares, representing approximately 8% of the total forest area, are exempt from mandatory management planning. Instead, a maximum annual harvest limit of 5 m³ per hectare is applied, which helps to maintain the potential timber supply within clearly defined boundaries (Popa et al., 2020). Moreover, in Romania, since 2017, managers of publicly owned forests have been required to publish the Volume Estimation Documents (VEDs), along with the geographic coordinates of the harvesting sites, on their official websites (Capalb & Enescu, 2018).

Romania's law on forests is more up to date (2024) than Serbia's (2010). Serbia's law covers many key aspects of sustainable forest management, but it is older and thus less open towards the very latest specific innovations (urban green belts, heavy digital monitoring, new governance studies) than Romania's new law. The gap between law on paper and implementation in practice is an issue in both countries. Romania's New Forestry Law opens doors to potential improvements in forest management but falls short of clearly implementing the strategic objectives outlined in the National Strategy for Forests, meaning while the legislation introduces several new concepts for forest management, it lacks concrete guidance for the development of subsequent regulations (WWF, 2024).

Table 2 provides an overview of forest dynamics in Serbia and Romania for the period 2020–2025, including data on afforestation, natural forest expansion, and deforestation, as well as the resulting net change in forest area.

The data provide further details on planted forests, distinguishing between plantation forests, areas with introduced species, and other types of planted forests, as well as information on other wooded land contributing to the total growing stock.

According to the note in Table 2 referring to Romania's Forest Law (Law No. 331/2024), deforestation is defined as *"the action of removing forest vegetation from land included in the National Forest Fund (NFF), without subsequent regeneration of that vegetation, resulting in a change in land use and/or the loss of its forest designation."*

Regenerated areas in Romania, categorized by regeneration type and land category, are shown in Table 3. Across the entire period under analysis (2020–2024), artificial regeneration consistently represented a smaller portion of the total regenerated area than natural regeneration. Moreover, the data indicate a gradual increase in the proportion of naturally regenerated areas, with a marked expansion of regenerated area observed from 2022 to 2024 (FAO, 2025a).

The National Forestry Administration ROMSILVA that operates under the authority of the Ministry of Environment, Waters and Forests in Romania has annual afforestation programs for the state-owned forest fund. Their afforestation plan for the years 2021-2025 shows that the area planned for natural regeneration is two thirds percent of the total area (63.4% in 2020 and 64.5% in 2025) and artificial regeneration is considered on one third of the total area through the year span mentioned (36.6% in 2020 and 35.5% in 2025), respectively.

Table 2. Forest expansion, regeneration and deforestation in Serbia and Romania (2020-2025)

FRA 2025 categories	Serbia		Romania	
	Area (1000 ha/year) 2021-2025	Area (ha) 2020-2025	Area (1000 ha/year) 2020-2025*	Area (ha) 2020-2025**
Forest expansion (a=a1+a2)	**39.68**	**198,399**	**5.64**	
…of which afforestation (a1)	0.3	1,496	0.48	1,425
…of which natural expansion (a2)	39.38	196,903	5.16	
Deforestation (b)*	**0.02**	**89**	**0.02**	**72.13**
Forest area net change (a-b)	**39.66**	**198,310**	**5.62**	

FRA 2025 categories	Forest area (1000 ha)			
	Serbia		Romania***	
	2020	2025	2020	2025
Naturally regenerating forest (a)	**3,065.04**	**3,251.12**	**6,033.98**	**6,280.69**
…of which primary forest	1.00	1.00	71.08	71.08
Planted forest (b=b1+b2)	**211.76**	**224.08**	**895.07**	**676.44**
…of which plantation forest (b1)	30.25	32.54	0.00	0.00
…of which introduced species	0.00	0.00	0.00	0.00
…of which other planted forest (b2)	181.51	191.54	895.07	676.44
Total (a+b)	**3,276.80**	**3,475.20**	**6,929.05**	**6,957.13**

FRA 2025 categories	Total growing stock (million m3 over bark)****			
	Serbia		Romania	
	2020	2025	2020	2025
Naturally regenerating forest (a)	**529.37**	**583.17**	**2,102.00**	**2,187.94**
…of which primary forest				
Planted forest (b=b1+b2)	**43.84**	**50.86**	**252.79**	**191.04**
…of which plantation forest (b1)	7.39	7.62	0.00	0.00
…of which introduced species	0.00	0.00	0.00	0.00
…of which other planted forest (b2)	36.45	43.24	252.79	191.04
Total forest (a+b)	**573.21**	**634.03**	**2,354.79**	**2,378.98**
Other wooded land	**4.43**	**4.93**	**0.79**	**0.79**

*Note for Romania: Forest area removed from the national forest fund = designation to other users = deforestation
**Note for Romania: 2020-2025 stands for the average of the years 2015-2017
*** Note for Romania: Primary Forest data for 2020 and 2025 are from NFI 2018
****Note: Data is used from the most recent NFIs in both countries

For every year planned, Romsilva states that „*in addition to the natural and artificial forest regeneration works, which will be carried out in the years 2021-2025, the National Forestry Administration - Romsilva will carry out in the state's public forest fund works to complete the plantations established in previous years and works to restore the plantations affected by various harmful factors (drought, fires, etc.)*" (RNP, 2025).

For Serbia, the report on forests growing and silviculture, including both state and private forests, is issued annually and is based on the data provided by the reporting units of the public enterprise "Srbijašume" and "Vojvodinašume", as well as public enterprises of national parks (SOSRB, 2024). Regenerated areas by regeneration

type and land category for the period 2020-2024 are also presented in Table 3.

Table 3. Regenerated areas in Romania and Serbia by regeneration type and land category, 2020–2024 (ha)

	Romania					
Land categories	**2020**		**2021**		**2022**	
Total regenerated	25,219	100.0%	27,188	100.0%	28,021	100.0%
Natural regeneration - total	17,526	**69.5%**	19,781	**72.8%**	19,578	**69.9%**
Artificial regeneration - total	7,693	**30.5%**	7,407	**27.2%**	8,443	**30.1%**
Land categories	**2023**		**2024**			
Total regenerated	26,744	100.0%	25,579	100.0%		
Natural regeneration - total	19,354	**72.4%**	17,121	**66.9%**		
Artificial regeneration - total	7,390	**27.6%**	8,458	**33.1%**		
	Serbia					
Land categories	**2020**		**2021**		**2022**	
Total regenerated	2,936	100.0%	2,193	100.0%	2,874	100.0%
Artificial regeneration - total	1,481	**50.4%**	1,203	**54.9%**	1,365	**47.5%**
Plantations and protective areas growing - total	1,455	**49.6%**	990	**45.1%**	1,509	**52.5%**
Land categories	**2023**		**2024**			
Total regenerated	2,906	100.0%	3,091	100.0%		
Artificial regeneration - total	1,729	**59.5%**	1,973	**63.8%**		
Plantations and protective areas growing - total	1,177	**40.5%**	1,118	**36.2%**		

Artificial regeneration area in Serbia's forests has been rising in the mentioned period, while plantations and protective areas growing has faced some minor decline in the period from 2022 to 2024. Success of actions like reforestation is imperative considering Serbia's limited funding (Ivetić, 2015). Directorate of Forestry of Ministry of Agriculture, Forestry and Water Management has signed in previous years international projects with FAO and GEF, such as "*Creating conditions for the restoration of forest areas at the political, field and market levels with the aim of achieving a neutral state of land degradation in Serbia*", "*Enabling environment at policy, field and market levels for Forest Landscape Restoration (FLR) to achieve Land Degradation*

Neutrality (LDN) in Serbia" (MAFW, 2025), aiming to promote and implement good practices for forest restoration and halting land degradation in Serbia which should enable the implementation of the decision of the Government of Serbia to increase the forest area to 41% of the national territory by 2050.

On the 20th of February 2025 an agreement for the project "Enhancing the resilience of Serbian forests to ensure energy security of the most vulnerable while contributing to their livelihoods and carbon sequestration (FOREST Invest)'' was signed between FAO, in its capacity as an Accredited Entity of the Green Climate Fund (GCF), the Government of the Republic of Serbia, represented by the Ministry of Agriculture, Forestry and Water Management, as well

as two public enterprises "Srbijašume" and "Vojvodinašume". Among other things, the project envisions afforestation of 7,000 hectares with climate-resilient tree species, the conversion of 51,000 hectares of degraded low forests into high forests, and the rehabilitation of at least 500 hectares of abandoned private agricultural land through agroforestry plantations (FAO, 2025b).

The problem that seems to occur in both countries is illegal logging. In the data from 2020 state of Romania's forests, for the prevention of illegal activities, 10,871 patrol actions were carried out, some of them with the support of the Gendarmerie, the Romanian Police, the Forestry Guard, and other institutions (MEWF, 2020). At the national level, forestry offenses were identified by forestry personnel from the Ministry of Environment, Waters and Forests through the Forestry and Hunting Control Directorate – Forestry and Hunting Regime Control Service (SCRSC), as well as from the Ministry of Environment, Waters and Forests through the Control, Integrity and Anti-Corruption Directorate, the Forest Guards (GF), the National Forest Administration – Romsilva (RNP), the National Institute for Research and Development in Forestry "Marin Drăcea" (INCDS), and private forestry districts. For offenses involving the unlawful cutting of trees, a total of 2,951 reports were drawn up. The total volume of illegally cut trees recorded in these reports amounted to 161,250 m^3. Reports issued for unlawful tree cutting, as follows: 2,951 criminal offenses, 14 offenses for illegal use of the official marking device and 4,464 contraventions. Total volume identified as illegally cut is 213,425 m^3 and total estimated prejudice from illegal tree cutting was 12,850,614 euro (MEWF, 2020). A research on challenges for a sustainable

ecosystem management of Carpathian forests states that although in theory forest ecosystems within protected areas are managed to the forest and parks management plans, in reality these plans are not always fully enforced due to a range of factors one of which is that while there is good legal framework, enforcement of the law is weak and often leads to over-cutting and illegal logging (Frone & Frone, 2014).

The restitution process of forest lands has diversified ownership forms and remains an important factor whose intensity and long-term effects can only be evaluated after a significant period of time and the initiation of the integrated IT system for wood tracking (SUMAL 2.0), the operationalization of the FMIMS system, and the development of the "Forest Radar" for institutions with relevant responsibilities helped to reduce forestry-related criminal activities in Romania.

In Serbia, there is also an occurring problem with illegal logging, originating from weak monitoring and enforcement (Jovanović & Milanović, 2017). Remote forest areas, insufficient staffing or resources for forest protection, and administrative inertia make illegal logging easier. Many private forest parcels are small, neglected, or the owners live elsewhere and these become vulnerable. Although laws exist, they may be poorly applied. The legal framework in Serbia includes prohibitions on "forest devastation" and improper cutting (Serbia's Forest Law), yet although inspections and law-enforcement exist, outcomes are often weak (Radosavljević et al., 2025). In 2020, a total of 24,522 m³ of timber was illicitly felled in state forests; this figure amounted to 19,205 m³ in 2021, 21,180 m³ in 2022, 26,649 m³ in 2023, and 37,010 m³ in 2024, respectively. This shows that the volume of

the illegally logged trees is increasing every following year (SOSRB, 2024).

Sustainable forest management (SFM) involves looking after forests in accordance with the UN principles of sustainable development. Criteria and indicators are tools used to define, guide, monitor and assess progress towards sustainable forest management. Forests are managed under a long-term plan (10 or more years) to meet sustainable goals, with periodic reviews (UNECE, 2020). Forest management plans include forest protection plans for protected areas. In 2020, 80.64% of Romania's forest area was managed under a long-term forest management plan (UNECE, 2020), a proportion expected to remain unchanged through 2025 (FAO, 2025a). According to the new Forest Code, Romania currently plans to extend the validity of forest management plans from 10 to 20 years (Duduman & Nichiforel, 2025).

Proportion of forest area under a long-term forest management plan in Serbia in 2020 was 42.11% of forest area (UNECE, 2020). According to the GFRA FAO report, until 2025 that percentage for Serbia has risen to 42.39% of forest area under a long-term forest management plan (FAO, 2025a).

Certification is a voluntary process, where precise values include forest areas and companies certified under the Forest Stewardship Council – FSC (Enescu & Timofte, 2019; Nichiforel et al., 2024) and the Programme for the Endorsement of Forest Certification – PEFC (Ilie et al., 2018; Enescu et al., 2019).

The forest area certified under independently verified forest management schemes in Serbia increased from 948.10 thousand hectares in 2020 to 1,024.61 thousand hectares in 2024, while in Romania it grew from 2,808.68 thousand hectares in 2020 to 3,493.26 thousand hectares in 2024 (FAO, 2025a).

CONCLUSIONS

Romania's integration into EU structures has strengthened its regulatory enforcement through mechanisms such as the Forest Information System for Europe (FISE), SUMAL 2.0, and the continuous adaptation of its Forestry Code. These tools ensure greater transparency and alignment with European forest management standards, though challenges remain in translating new legislative provisions into consistent practice.

Serbia, on the other hand, continues the gradual harmonization of its forest policy and management framework with EU directives and standards. However, institutional capacity, limited monitoring infrastructure, and insufficient enforcement mechanisms continue to slow progress. Effective implementation of EU-aligned responsibilities, including those related to the timber market, Forest Information System, Natura 2000, bioeconomy, and subsidies, requires both legislative coherence and significant investment in human and technological resources.

Within the broader global framework for sustainable forest management, both Romania and Serbia face similar challenges: illegal logging, forest degradation, and the need for stronger community participation in forest protection.

Romania benefits from EU financial mechanisms such as National Recovery and Resilience Plan (NRRP), Common Agriculture Policy (CAP) and LIFE projects that support reforestation, monitoring, and climate resilience, while Serbia must balance conservation goals with economic

development under tighter resource constraints.

Forestry legislation in both countries is in a continuous process of adaptation, shaped by evolving ownership structures and rising public expectations regarding the ecological and social roles of forests. Negative factors such as frequent changes in property restitution laws have disrupted forest governance and delayed certification and management processes. Consequently, the optimal management of national forest resources in both Romania and Serbia requires coherent, practical, and technologically supported legislation, implemented by qualified human resources capable of applying both national and European forestry policies.

Overall, Romania demonstrates stronger regulatory alignment and reporting consistency through EU mechanisms, while Serbia shows steady, while slower in progress in legislative harmonization. Ensuring the long-term sustainability of their forest sectors will depend on deepening institutional reforms, enhancing monitoring systems, and fostering cooperation between state authorities, private owners, and local communities.

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