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THE FORESTRY SECTOR IN ROMANIA – DEVELOPMENTS AND PERFORMANCE FROM BIOECONOMY PERSPECTIVE

ABSTRACT

The Romanian forestry sector has experienced significant structural changes after 1989, both at the level of the regulatory framework and mainly in terms of the economic behaviour, with direct impact on sectoral performance. The importance of the forestry sector nationwide derives from at least two essential considerations, namely the existence of important resources and the ability to capitalize on these resources, both at primary industry level and at the level of manufacturing industry (furniture, pulp and paper, etc.). These add to the ecological component of forests and the social component of forestry resources. In the above-mentioned context, and in the context of the main existing approaches to the forestry sector from bioeconomy perspective across Europe, the present approach aims to make an analysis of the forestry sector and its related industries, by reference to the stock of resources and the level of sectoral performance.

Key words: Bioeconomy, forestry sector, resources, efficiency.

JEL Classification: Q57.

1. INTRODUCTION

Throughout history, forests have played an important role, contributing to the development of human society, having both a physical-geographical and anthropo-geographical role. Specifically, the roles played by forests are mainly manifested in several directions, such as: formation and shaping of the Earth's crust, climate, soil, water regime, agricultural crops, people's health, landscape. Specifically, worldwide and at the level of each state, the forest is one of the essential resources, both in terms of the existing forest resource fund and mainly in terms of its sustainable valorization.

Given that the use of forest resources is an intervention in the natural balance of the environment, the integrated approach to managing the use of forestry resources will be more efficient, aiming not only to exploit forest resources, but also their more intensive regeneration, safeguarding and protection. Thus, the complex use of forest resources requires a rational, economically justified valorization, with all the benefits of using all the possible utilities.

2. STATE OF KNOWLEDGE

Across the EU, forests cover 182 million hectares, accounting for 5% of the forest resources worldwide. Practically, forests cover 43% of the EU area, and the six EU Member States with the largest forested areas (Sweden, Finland, Spain, France, Germany and Poland) account for two-thirds of the forested areas of the EU (European Commission, 2021).

With more than 3.5 million jobs, the forestry sector ranks third in the EU in terms of labour employment, next to the metallurgical and food industries. More than 451.8 thousand enterprises in the forestry sector contribute by 7% to the economic growth and use only 60% of the wood that can be used annually (European Commission, 2021). In fact, wood represents an important resource, with a major economic role for the rural areas.

The interest in the forest fund is a great concern of the European Commission and European Parliament through initiatives and actions aimed to put into value the types of forests on the territory of the Member States and recognizing the importance of forest ecosystems at a level comparable to that of the agro-ecological systems, each with a decisive role in generating sustainable economic resources.

Furthermore, the concerns at EU level in the recent period have addressed the forest sector from a bioeconomic perspective, targeting the activities that may involve the use of biotechnology and biomass in this field of activity in the production of goods, services or energy. Such an approach is increasingly being analyzed starting from the ecological and socio-economic functions of forests.

The bioeconomic approach to the forestry sector implies promoting all kinds of innovations and practices for all sustainable food and agricultural systems, including forestry and production based on bioresources, through a systemic and cross-cutting approach that interconnects actors, territories and value chains (European Commission, 2018). Practically, at the moment, new opportunities are being identified for the forestry sector to replace non-sustainable raw materials by biomaterials in the sector of constructions and packages, to provide more sustainable innovations in sectors such as textiles, furniture pieces and chemicals from forestry, as well as new business models based on the valorization of forest eco-system services (Panacea, 2020).

In the year 2021, recognizing the central and multifunctional role of forests and the contribution of foresters and of the entire forest value chain to achieving a sustainable and climate-neutral economy by 2050, a new forest strategy has been adopted at Community level by the year 2030, the aim of which is to overcome the difficulties currently facing the forestry sector. Briefly, the new forest strategy (European Commission, 2021) focuses on the following areas:

- Promoting sustainable forest bioeconomy for wood products with a long lifespan;
- Ensuring sustainable use of wood resources for bioenergy;

- Promoting forest economy based on the valorization of non-wood products;
- Developing skills and providing people with the necessary means to act to build a sustainable forest bioeconomy;
- Protecting the last remaining primary and secular forests in the EU;
- Ensuring forest restoration and strengthening sustainable forest management to adapt to climate change and for forest resilience;
- Reforestation and afforestation with biodiversity-rich forests;
- Financial incentives for forest owners and managers, to improve the quantity and quality of forests in the EU;
- Strategic monitoring, reporting and collection of data on forests;
- A robust research and innovation agenda to improve knowledge base for forestry issues;
- An inclusive and coherent EU forest governance framework;
- Accelerate implementation and ensure compliance with existing EU legislation.

Downscaling the analysis at national level, it should be specified that the national legislation (Forestry Code, 2021) defines the forest fund as "*all forests, land intended for afforestation, land serving the needs of cultivation, production or forestry administration, ponds, riverbeds, other land with forestry destination, including non-productive land, included in forest management plans on January 1, 1990, including the changes in areas, according to entry-exit operations carried out under legal conditions, represent, regardless of the ownership form, the national forest fund*".

According to the law, land areas with a surface of minimum 0.25 ha, covered with trees, with a minimum height of 5 m at maturity in normal vegetation conditions are considered forests and are included in the national forest fund.

Thus, in the above-mentioned context, the forest land in Romania covers 6.6 million ha, accounting for about 27% of the country's total area. Although forests are an important resource of the national economy, their valorization and regeneration have often been achieved without considering the potential and the rational and competitive use of the forest fund, with an adverse impact on sustainability and durability (Bucur, 2021).

The permanent legislative changes in this field, most often not correlated with those from other fields of activity, illegal logging and timber exports to the detriment of processed products have had a negative impact on sectoral competitiveness.

The studies to date at academic and civil society level have highlighted the importance of forest fund in terms of generated products, bioeconomy and circular economy. These add to the programmatic documents developed by institutions with specific responsibilities, documents that are difficult to implement by reference to certain provisions of the legal framework.

However, at the level of the ministry in charge, a forest strategy was developed for the time horizon 2018–2027, whose main objective is to harmonize

the forest functions with the current and future needs of the Romanian society, through a sustainable management of national forest resources. In relation to this approach, it should be noted that one of the five strategic objectives pursued (Ministry of Environment, Forests and Waters, 2017) is to increase competitiveness and sustainability of forest industries, of bioenergy and bioeconomy as a whole, whose budget of only 1.250 million RON is not significant in relation to the measures and actions pursued, namely:

- increasing the valorized timber volume in assortments;
- diversification of wood biomass categories usable for energy production;
- supporting the endowment in modern technology of the forest operators and primary processing units;
- providing permanent information on the timber market.

However, the adoption of a new forest strategy at Community level also involves the adjustment of national legislation, including the previously mentioned strategy, in accordance with the Community lines of action.

Nationwide, the new European strategy has generated ample debates, mainly among profile organizations as well as at civil society level. Thus, for instance, in the opinion of the Romanian Forestry Association (ASFOR), the new European Forest Strategy does not sufficiently ensure the balance between the environmental, social and economic functions of forests. According to ASFOR, the strategy fails to recognize the complexity and importance of reaching a balance between the economic, social and environmental role of forests.

The scenarios on forestry practices proposed in the strategy should ensure the functioning of the European bioeconomy on the medium and long term. This implies the use of wood on an increasingly large scale. At the same time, forest carbon sequestration should increase, but this does not mean giving up timber harvesting, but increasing sustainability and maximizing the use of timber harvested from forests (ASFOR, 2021).

In the opinion of previously mentioned organizations, the new European strategy fails to identify the adequate measures to increase the timber supply on the market and does not address the issue of increasing competitiveness and the general conditions for the growth of bioeconomy. An efficient strategy for the sustainable management of forests should aim at strengthening the ecological component in line with social and environmental commitments.

In the context of ample debates at national level on the importance and role of the forestry sector, in the recent national programmatic document, endorsed by the European Commission in October 2020, namely Romania's National Recovery and Resilience Plan (NRRP) (Ministry of the European Funds, 2021), a set of action guidelines have been established on forests and biodiversity protection.

The objective had in view is the harmonization of forest management practices with those on biodiversity conservation and environmental protection in the context of the European Green Deal and ensuring the transition to a climate-

neutral Europe by creating new forested areas and restoring degraded habitats. The establishment of the objectives and reforms envisaged by NRRP started from the identification of the main environmental challenges signalled out in the Specific Country Reports for Romania, namely:

- illegal exploitation of forests;
- high air pollution levels, natural disasters triggered by climate changes;
- difficulties in the implementation of afforestation projects and concrete measures for removing bottlenecks and for the afforestation of degraded land areas;
- insufficient capacity of intervention in stands affected by destabilizing factors.

The reform of the management and governance system in forestry aims at ensuring a sound and clear strategic and regulatory framework, which makes it possible to implement sustainable and durable forest policies supporting climate change mitigation and adaptation to climate change. In this sense, it is envisaged that the reform measures will be implemented through four main actions:

a) Carrying out an independent assessment of the governance, institutional and regulatory deficiencies, of the problems in the implementation of current legal provisions in the field of forestry, including recommended actions to correct the identified deficiencies;

b) Adopting the National Forest Strategy 2020–2030 that needs to cover specific mandatory rules for afforestation/reforestation, namely:

- ✓ specific rules for climate-resilient tree planting actions, with no negative impact on biodiversity and for prohibiting the use or spread of non-native invasive species;
- ✓ specific rules for the production of reproductive material to focus on tree species and ecotypes appropriate for future climate conditions with the involvement of Romsilva and the private sector, as well as measures to discourage the creation of commercial tree nurseries for monocultures with short rotation/production cycles (e.g., acacia, poplar, willow);
- ✓ specific rules for afforestation to positively contribute to the objectives targeting biodiversity conservation, water management and soil protection by prohibiting afforestation/reforestation on high natural value agricultural land, meadows or in wetlands, with the exception of habitats restoration;
- ✓ specific rules for including prevention measures that increase the natural absorption capacity of soils in the forest management activities and in specific legislation with the requirement to adapt to climate change, to ensure that forest management is based on species monitoring;

a) Specific rules for urban afforestation be achieved through a *landscape level approach* that contributes to strengthening connectivity with natural or semi-natural areas (forests, agricultural areas), focusing on connecting habitats in correlation with green infrastructure and corridors;

b) Specific requirements for afforestation/reforestation projects to be carried out in areas exposed/vulnerable to climate risks, drought and floods in particular and, where appropriate, requirements for afforestation or reforestation to reduce the risks associated with these hazards.

In the context of the above mentioned, the following investments are considered by the National Recovery and Resilience Plan (NRRP):

- a national afforestation and reforestation campaign, including urban forests (budget: 730 million euros);
- development of modern production facilities for forest reproduction material (budget: 50 million euros);
- integrated systems to reduce the risks of torrential floods in forest basins exposed to such phenomena (budget: 22 million euros).

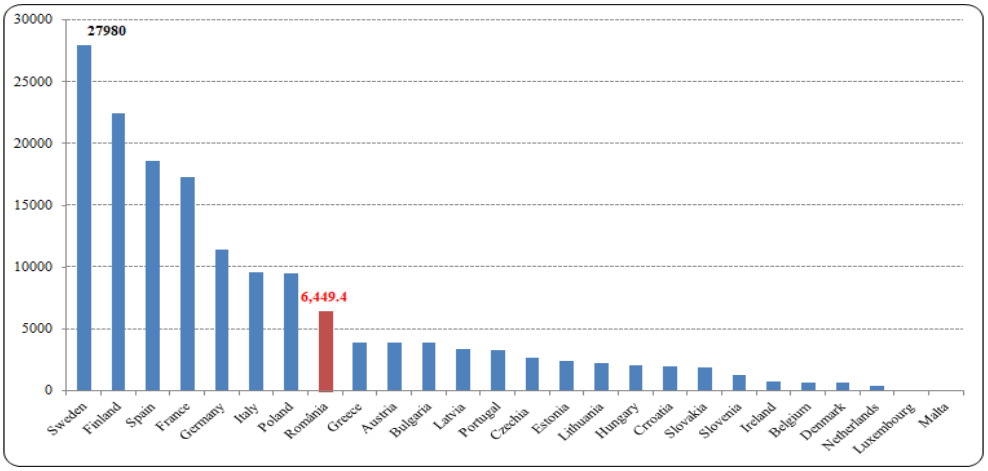
It should be noted that in the context of fairly tight implementation deadlines, the implementation of measures, of legislative measures in particular, and attracting necessary funds require a joint effort of all involved stakeholders, so as to ensure the sustainability of the forestry sector and strengthen its relationship with the other activity sectors, from a bioeconomic perspective.

3. MATERIAL AND METHOD

Starting from the analysis of the main approaches from the literature to the forest fund and its importance in bioeconomy terms, the present approach aims to conduct an analysis of the forestry sector and its related industries, by reference to the stock of resources and the sectoral performance level, based on statistical information from national and international statistics. From a methodological point of view, the present approach uses well-established statistical methods, such as comparisons, dynamics and structures, the results being presented both under tabular and graphical form. The time period considered is 2007–2020, with adjustments of its limit according to the availability of statistical data. To ensure data comparability, the value indicators were converted into euros, at the average annual exchange rate provided by the database of the National Bank of Romania (NBR).

4. RESULTS AND DISCUSSIONS

In the year 2020, with a total area of around 6.6 million ha, the forestry sector accounted for 27% of the country's area. The area under forests accounts for 97.7% of the total area of 6.6 million ha, distributed throughout the 8 development regions. In the year 2020, Romania ranked 8th in the EU in terms of area covered by forests, accounting for 4.1% of the total forest cover of the European Union (Figure 1). Compared to the former communist bloc countries, with 6449.4 thousand ha, Romania ranks 2nd after Poland (9483 thousand ha).



Source: Calculations based on Eurostat data, 2021

Figure 1. Forest cover in the EU in the year 2020 (thousand ha)

With reference to the period 2007-2020, it should be noted that the forest fund in Romania slightly increased, both in total and in terms of forest cover. Thus, in 14 years' time, the forest fund followed a slightly increasing trend, up by 1.8%, from 6.5 thousand ha (2007) to 6.6 thousand ha (2020), while the forest cover averagely increased by 2.1%, from 0.5% (Sud-Muntenia Region) to 4.5% (Vest Region).

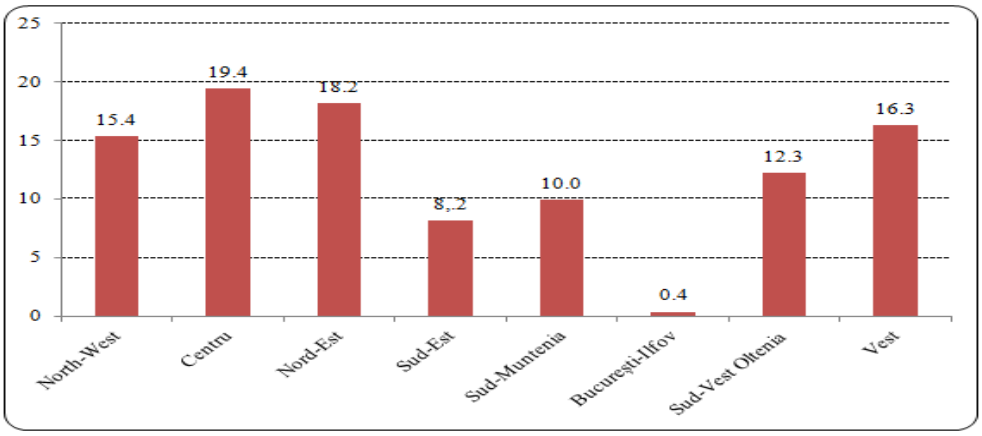
Table 1

Evolution of area covered by forests, total and across regions in the period 2007–2020, thousand ha.

	TOTAL	Nord-Vest	Centru	Nord-Est	Sud-Est	Sud-Muntenia	București-Ilfov	Sud-Vest Oltenia	Vest
2007	6314.9	949.1	1233.8	1158.4	521.5	638.3	24.9	784.4	1004.5
2008	6308.9	958.1	1231.2	1150.7	516.5	638.7	25	783.8	1004.9
2009	6334	961.5	1235.4	1159.1	521.2	638.3	24.8	785.5	1008.2
2010	6353.7	967.9	1235.9	1160.4	520.6	640.7	24.9	784.5	1018.8
2011	6364.9	970.4	1240.4	1162.2	518	640.9	24.9	787	1021.1
2012	6372.8	971.7	1241	1163.1	520.8	640.7	24.9	787.8	1022.8
2013	6380.6	971.9	1244.3	1163.2	518.2	640.8	25.1	788.8	1028.3
2014	6387.3	973	1245	1164.7	518.4	640.8	25.1	789.8	1030.5
2015	6398.8	973.2	1243.5	1166.9	521.4	642.3	25	791.9	1034.6
2016	6404.4	974.1	1244.1	1169.2	523.1	642.1	25	791	1035.8
2017	6405.8	975.3	1243.4	1170.2	524.1	642.7	24.9	788.3	1036.9
2018	6418.2	980.4	1247.1	1172.2	524	641.8	24.9	784.5	1043.3
2019	6427.3	982	1248.4	1172.1	526.1	642.1	25.1	784.4	1047.1
2020	6449.4	990	1252.2	1173.9	526.9	641.8	25.2	790.1	1049.3
2020/2007 (%)	2.1	4.3	1.5	1.3	1.0	0.5	1.2	0.7	4.5

Source: author's calculations based on Tempo-Online, NIS data, 2021

Although in the period 2007–2020, the area covered by forests increased as share in total, 69.2% of the forest area is found in four development regions, namely Centru, Nord-Est, Vest and Nord-Vest, by percentages that exceed 15% of total forests (Figure 2).



Source: author's calculations based on Tempo-Online, NIS data, 2021

Figure 2. Distribution of areas covered by forests across regions in the year 2020, %

While in terms of total forest fund and forest cover, the period 2007–2020 is characterized by an upward trend, in terms of areas covered by resinous and deciduous species, the reference period is characterized by a divergent trend, both per total and by regions.

Thus, the area covered by resinous species, with three exceptions, is on a downward trend, as a result of the logging industry, while the area under deciduous trees increased in seven of the eight development regions, by percentages ranging from 0.7% (Sud-Est) to 6.5% (Vest).

Deepening the analysis by the two species, it can be noticed that deciduous trees rank first, by percentages ranging from 55.9% (Centru) to 99.6% (București-Ilfov) in the year 2020. The difference is represented by the resinous species, the share of which does not exceed 30% of the area under forests, with two exceptions.

In this context, it must be noted that in the year 2020, three out of the eight development regions (Nord-Vest, Centru and Nord-Est), cumulate 73.8% of the total area under resinous species, i.e. 1414 thousand ha out of total 1916 thousand ha. This percentage is exceeded by the area under deciduous forests, where five of the eight development regions (Vest, Nord-Vest, Centru, Nord-Est and Sud-Vest Oltenia) have 3580.1 thousand ha, i.e. 79% of the total area under deciduous forests.

In 14 years' time, the cutting wood covered area in total forest land has been on a noticeable upward trend. Thus, for instance, the regeneration cutting wood covered area doubled, from 84 276 ha in 2007 to 185339 ha in the year 2020.

In the regeneration cutting wood covered area, the area under conservation cuttings ranks first, the surface of which increased 10 times compared to that in 2007. A similar dynamic can be also noticed in the case of transformation cuttings of wooded pastures, their area increasing about 8.3 times in 2020 compared to 2007.

It must be noted that the volume of wood harvested significantly increased, both per total and across regions. Thus, while per total country we can notice an increase of the volume of harvested wood by about 14% in the post-accession period, by regions, this increase ranges from 4.03% (Nord-Est) to 8 times in București Ilfov (Table 2).

Table 2

Evolution of the volume of harvested wood by total species in the period 2007–2020, thousand m³.

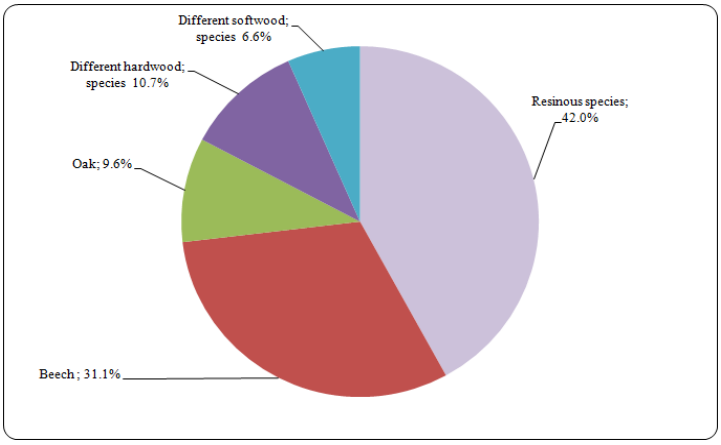
	TOTAL	Nord-Vest	Centru	Nord-Est	Sud-Est	Sud-Muntenia	București-Ilfov	Sud-Vest Oltenia	Vest
2007	17237.6	2320.4	4040.9	4875.5	1160.1	1580.9	6.3	1252.7	2000.8
2008	16704.6	2109.7	3937.3	4755.4	1109.4	1462.2	78.4	1326.7	1925.5
2009	16519.9	2069	4185	4937.1	1119.7	1234	76.4	941	1957.7
2010	16991.6	2054	3911.8	4977.8	1106.2	1564.2	71.3	1218.2	2088.1
2011	18705	2337.4	4385.2	5167.4	1297.5	1764.6	74.9	1382.9	2295.1
2012	19081.2	2413.4	4265.4	5333.7	1371.9	1958.2	73.5	1412.4	2252.7
2013	19282.1	2315.1	4455.5	5412.5	1402.8	1882.5	74.8	1413.3	2325.6
2014	17889.3	2107.4	4411.8	4668.8	1282.3	1748.4	73.7	1378.9	2218
2015	18133.1	2323.7	3989.5	4811.1	1327.9	1802.4	74.4	1526.2	2277.9
2016	17197.5	2082.8	3983.2	4688.6	1244.1	1705.2	74.7	1346.6	2072.3
2017	18315.8	2333.7	3637.5	5333.6	1312.9	1769.6	68.9	1509.9	2349.7
2018	19461.5	2721.6	4149.6	5499.2	1334.5	1756.8	69.7	1448.6	2481.5
2019	18903.7	2572.7	4422.3	5062.2	1275.6	1711.2	66.4	1381.1	2412.2
2020	19652	2461.1	5055.4	5071.8	1259.6	2087.4	57.6	1331.6	2327.5
2020/2007 (%)	14.01	6.06	25.11	4.03	8.58	32.04	814.29	6.30	16.33

Source: author's calculations based on Tempo-Online, NIS data, 2021

In the year 2020, out of the 19562 thousand m³ harvested, 51.5% come from the regions Nord-Est (25.8%) and Centru (25.7%), followed at short distance by Nord-Vest (12.5%), Vest (11.8%) and Sud-Muntenia (10.6%). The same increasing trend in the volume of wood harvested can be also found by species. In this context, it is worth noting a strong increasing trend of the volume of harvested wood in oak, beech and hardwood species, with significant oscillations across regions. Thus, for instance, the 8 times increase of the total volume of wood harvested in the region București-Ilfov is due to the 10 times increase in the volume of oak wood, followed by various softwood species and by hardwood

species. In the year 2020, nationwide, out of a total volume of 19562 thousand m³ of harvested wood, the resinous species (42%) and beech (31.1%) together account for about 73%, the difference up to 100% being represented by oak trees and other hardwood and softwood species (Figure 3).

By assortments and species, the volume of exploited round timber volume followed a noticeable upward trend in the period 2007–2020. While the smallest increase was noticed in logs, the volume of other round timber assortments increased more than 3 times in beech, while in oak and various softwood species the exploited volume more than doubled in the year 2020. On the other hand, the dependence of an important number of households on heating with wood caused a significant increase of the volume of firewood, mainly in the category of oak, resinous species and beech, which doubled the exploited volume in 14 years' time. Even in the conditions of measures established through NRRP on the heating modalities, we consider that the volume of firewood will continue to increase, regardless its price; the reason behind this is found in the much higher prices of other sources of heating, such as natural gas or electricity.



Source: author's calculations based on Tempo-Online, NIS data, 2021

Figure 3. Structure of the volume of wood harvested in Romania, in the year 2020, by species, %

Furthermore, it should not be overlooked that at this moment there are still many households that are not connected to the utility networks, which will lead to the continued use of wood as a source of heating.

In the context of massive logging in the recent period, the intervention on the execution of forest regeneration works is insignificant. Furthermore, compared to the year 2007, the land area on which artificial regeneration works were carried out decreased by 25.1% nationwide, by percentages ranging from -1% (Centru) to -63% (Vest). The same trend, even stronger, can be noticed by species, the decrease of areas in which forest regeneration works were carried out is much more noticeable in the case of deciduous species than in the case of resinous species (Table 3).

Table 3

Evolution of areas on which forest regeneration works were carried out, by total and by species, in the year 2020 compared to 2007, %.

	Total	Resinous	Deciduous
TOTAL	-25.1	-1.5	-42.1
Nord-Vest	-11.8	-3.5	-22.8
Centru	-1.0	9.7	-25.5
Nord-Est	1.6	25.3	-30.7
Sud-Est	-48.3	-11.5	-50.6
Sud-Muntenia	-60.1	-19.6	-65.5
București-Ilfov	81.8	-28.2	81.8
Sud-Vest Oltenia	-13.6	-69.8	-7.6
Vest	-63.0	-42.1	-56.5

Source: author's calculations based on Tempo-Online, NIS data, 2021

In the year 2020, 52.4% of the total area on which artificial forest regeneration works were carried out is found in the regions Nord-Est (29.6%) and Centru (22.8%), followed by Nord-Vest (14.8%) and Sud-Est (10.4%).

In the context of forest resources presented above, the economic performance of the forest sector cannot be questioned either. From this point of view, a first indicator taken into consideration is the volume of timber exploited by the logging industry.

From this perspective, it must be noted that in the period 2007–2020, the total volume of timber exploited increased by 35.5%, with the round timber taking the biggest share. Practically, in the 14 years' period, the total exploited volume of round timber increased from 89% (2007) to 91.2% (2020).

There was also a significant increase in the reference period in terms of secondary assortments, while the volume of exploited bark was down by almost 15 percent.

Speaking about the economic performance of forests in national economy, it should be noted that national statistics provide relevant information at the level of NACE economic activity classes[1], in terms of labour, number of active local units[2], turnover of forestry units, value of market output, its use by main sectors and gross value added.

In reference to the first indicator, in the period 2007–2018 (for which there are relevant statistical data), while at national level the number of employees followed an upward trend, in the forestry sector and other activity sectors that use

[1] Statistical classification of economic activities at national level.

[2] The local unit is an enterprise or part of it (workshop, factory, warehouse, office, etc.) located at an identifiable address.

forest products, there was a significant decline in the number of employees, mainly in wood processing and furniture industry (Table 4).

Table 4

Evolution of the number of employees by activity classes in the period 2007-2018, no.

Activities	2007	2008	2018	2018/2007(%)
Total economy	4885319	5046317	5068063	3.74
Forestry and forest exploitation; Fishing and aquaculture	36045	32443	37097	2.92
Woodworking, manufacture of wood and cork products, except furniture; manufacture of articles of straw and other plaiting materials	71919	68269	54489	-24.24
Manufacture of paper and paper products	15042	13261	14247	-5.29
Manufacture of furniture	85960	79962	64279	-25.22

Source: author's calculations based on Tempo-Online, NIS data, 2021

This diminution is mainly justified by the marketing of wood mainly as a primary product (in the form of logs) and less in the form of processed products. This leads to the loss of gross value added in the wood products sector, with a direct impact on sectoral competitiveness.

The slight increase in the number of employees in the forestry and forest exploitation sector is also due to the increase in the number of local active units in the primary sector, while the trend is noticeably decreasing in the processing sector (Table 5).

Table 5

Evolution of local active units by main activities in the forestry sector and in the sector of forest products processing/valorization, number

Activities	2008	2019	2019/2008 (%)
Total	567146	606390	6.9
Forestry and other related activities	754	883	17.1
Forest exploitation	1950	2856	46.5
Collection of non-wood forest products from spontaneous flora	25	111	344.0
Forestry-related services	236	114	-51.7
Wood cutting and planing	4337	2624	-39.5
Manufacture of wood products, cork, straw and other plating materials	3670	2469	-32.7
Manufacture of pulp, paper and cardboard	43	50	16.3
Manufacture of paper and cardboard items	774	824	6.5
Furniture manufacturing	4472	4402	-1.6

Source: author's calculations based on Tempo-Online, NIS data, 2021

Following the chain of capitalization and aggregation of economic indicators, it should be noted that in the period 2008–2020, the total turnover of forestry units increased by 33%, a trend visible mainly for capitalized products, as well as for other capitalizations of products. It should be noted that in all other main or related products of the sector the obtained turnover significantly diminished, by percentages ranging from -18.5% (beehive products) to -90.8% (game products) (Table 6).

Table 6

Comparative evolution of turnover of forestry units (thousand euros)

	2008	2020	2020/2008 (%)
Turnover of forestry unit	387766.0	515550.7	33.0
Valorized products	352890.0	437540.3	24.0
Other wood products	3421.6	2581.6	-24.6
Truffles and other edible mushrooms from the spontaneous flora	8420.4	2075.0	-75.4
Other non-wood products	1465.2	145.0	-90.1
Game products	14.1	1.3	-90.8
Fish products	1198.5	282.2	-76.5
Beehive products (bee honey)	85.0	69.3	-18.5
Other uses	739.0	884.7	19.7
Forestry services	4182.4	919.8	-78.0
Compensations, authorizations, tariffs	2437.1	2216.8	-9.0
Accessory products	45.8	24.3	-46.9

Source: author's calculations based on Tempo-Online, NIS data, 2021

Another indicator that reflects the sectoral performance is represented by the degree of utilization/distribution of forestry production and forest exploitation to related fields, which use the products of this activity sector. From this point of view, from the analysis of the input-output table (resources-utilizations balance) it results that more than 80% of the forestry production and forest exploitation are used in industries that use such products, including self-consumption. Practically, the degree of use of 87.7% of forestry and forest products in branches directly related or dependent on their production in 2007 was down to 81.2% in the year 2019 (Table 7).

Table 7

Distribution of forestry production and forest exploitation to other branches of activity, million euros

	2007	2019
Total	733.8	1673.2
Agriculture, hunting and related services	0.9	41.4
Forestry and forest exploitation	273.6	410.6
Fishing and aquaculture	0.0	18.7
Woodworking, manufacture of wood and cork products, except furniture; manufacture of articles of straw and other plaiting materials	334.2	656.0
Manufacture of paper and paper items	14.5	126.1
Manufacture of furniture	20.3	105.6
Other branches	90.3	314.9

Source: author's calculations based on Tempo-Online, NIS data, 2021

As indicator of sectoral performance and competitiveness, the trade balance of the forestry and forest operation sector reflects a divergent trend over the period 2007–2019. Thus, while in the first eight years the balance of trade was positive, exports constantly exceeding imports, after 2015 this indicator reversed its trend, imports exceeding exports (Table 8).

Table 8

Evolution of trade balance and gross value added, million euros

	Import	Export	GVA
2007	27.2	28.9	401.9
2008	23.9	22.9	406.9
2009	26.7	34.3	374.4
2010	37.5	63.4	408.0
2011	46.8	149.1	572.4
2012	59.3	119.8	567.5
2013	73.7	180.8	655.0
2014	88.6	154.8	533.5
2015	121.8	110.9	610.2
2016	134.6	69.9	695.5
2017	121.8	68.5	800.3
2018	127.7	51.8	856.0
2019	121.2	65.5	725.3
2019/2007 (%)	345.6	127.1	80.5

Source: author's calculations based on Tempo-Online, NIS data, 2021.

Although there are periods with a positive balance of trade, it should not be overlooked that such a situation can be explained by the increase of exports of raw materials, of raw products and not of processed products, whose gross value added is much higher than that of raw products.

Even though GVA in forestry and forest exploitation in the period 2007–2019 increased, compared to its share in GDP, it should be specified that this continues to be insignificant compared to the potential of this sector. Practically, GVA share of the forestry and forestry exploitation sector in GDP increased from 1.05% to only 1.54% over a period of 13 years.

5. CONCLUSIONS

Romania ranks 8th in the EU in terms of forest land area, with about 4% of the EU total, yet Romania's forestry sector is still facing many problems, both at the level of regulatory framework and mainly of the economic behaviour of active enterprises on the market, with a direct impact on sectoral performance.

In the context of the above-mentioned situation, we consider that the development of the forestry sector in Romania is still facing a number of problems, among which the following can be mentioned:

- The legal framework, often inconsistent and inapplicable, which adds to the lack of correlation with regulations in other areas;
- Inefficient management of forest land, also in terms of preventing illegal logging, with a negative impact on the future structure and quality of forest resources and on their sustainable capitalization implicitly;
- Lack of computerized evidence of forest land areas and of boundaries between owners;
- Lack of information on the domestic and foreign market of forestry products, alongside with the absence of sector-specific indicators to ensure an x-ray of the sector and provide predictability;
- Lack of a national timber industry policy to maximize the timber value on the market, with minimum costs and low environmental impact; in this sense, we consider it appropriate to intervene by stimulating investments in raw product processing and reducing exports, given the significant difference between the gross value added generated by processed products compared to that obtained from the export of raw materials. In addition, the social dimension should be also considered, i.e. the possibility to create new jobs to generate incomes for the local people;
- Lack of reaction or delayed response to events in the sector.

Furthermore, the forestry sector, through its resources and improvement of the processing capacity, represents a key element in shaping/consolidating local development clusters, given the horizontal relations of the sector with those in the field of wood processing, manufacturing of wood products or furniture.

Even though such an approach is not sufficiently developed at the moment, the development of a national bioeconomic strategy must take into consideration all the available resources, and the forestry sector can make a major contribution in this regard. Basically, in establishing the necessary measures, it should be considered that the functionality and state of forests is the result of multiple and cumulative interactions of different natural and anthropogenic factors and depend significantly on the implementation of an adaptive and sustainable management system, so that they can perform their specific ecosystem functions and services.

In this sense, the adjustment of the national forest strategy to the new requirements, the adequate implementation of measures established by the NRRP, as well as the development of a strategy in the field of bioeconomy, which practically ensure the relationship between the forestry sector and the processing sector of derived products, represent important factors in the sustainable development of the forestry sector in Romania.

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