

Analysis of Good Forest Improvement Practices Applicable in Romania

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Abstract – The paper aims to emphasize how Romania can improve its measures for protecting the national forest fund through environmental policies and strategies. The method used is the comparative one of data and reports from Romania, the European Union, Sweden and Austria. It follows from the analysis of statistical data, strategies, and European forest-related regulations that their implementation at the national level largely determines the effectiveness of European environmental policies. One of the solutions resulting from the analysis is to implement the European strategies coherently and fully, corroborated with the efficiency of the legal regime and the sanctions in the forestry field.

Keywords: Environmental law, environmental protection, sustainability, protected natural areas, forest fund, forestry regime, European Union.

I. INTRODUCTION

This paper analyses the situation of the forest fund in Romania with the generic one of the EU, particularly in Austria and Sweden.

For Romania, an analysis of how the state authorities protect the forest fund is relevant, given the importance of the consequences for the health of society and economic productivity, both in the short, medium, and long term.

II. ENVIRONMENTAL LEGISLATION AND THE LEGAL REGIME OF THE FOREST FUND

2.1. Environmental law in the Romanian legal system

In the Romanian legal system, environmental law is a distinct branch within the legal system. This appeared due to the continuous development of a category of "social relations regarding the protection, conservation and improvement of the environment, with specific features, which do not constitute an object of regulation for any of the traditional branches of law"

[1]. The environmental regulations have as their objective the establishment of positive measures, of sustainable development, with an impact in combating pollution, ecological management, and the sustainable exploitation of resources, which implicitly influence the social and economic space in the medium and long term. Regulations in the environmental area require a multidisciplinary approach, in "close interdependence with the natural sciences, technology and social sciences, involving both internal regulation and Community European or international, expressing a general interest of humanity"[1].

Both by general law and by special laws, the fundamental task of environmental legislation is to regulate the protection of the environment and various environmental factors. The following principles are considered in the law-making: prevention, precautionary, 'polluter pays' [1].

By drafting the Forestry Code and establishing the forestry regime, the legislator has the protection of forests as its objective. In this context, most norms are attributed to an imperative characteristic (onerous, prohibitive and coercive) through economic, technical, forestry and strictly legal measures that comprise the forestry regime.[1]

The set of special legal rules on the protection of forests is a distinct side of their legal protection. Thus, the legal norms relating to guarding and protecting public state forests are highlighted and ensured, according to art. 11 para. (1) of Law no. 46/2008 (Forestry Code), by the "National Forest Administration - Romsilva, an autonomous administration of national interest, under the authority of the State, through the central public authority responsible for forestry" for the publicly owned forest fund of the State under its administration "against illegal logging, thefts, destructions, degradations, grazing, poaching and other harmful deeds for the forest fund, according to the law" (Forestry Code art.51).

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2.2. Environmental protection issues

Environmental protection is a global problem with a multitude of protection laws, adopted as transnational and national regulations and guidelines, aimed at the sustainable use of water, soil, air and biomass [2].

Therefore, the issue of environmental protection can be seen in two aspects. The first aspect relates to the fact that the protection of the environment has as its unanimous task the discovery of the causes and sources of pollution, the establishment of ways of preventing, reducing, and removing the effects of pollution, and the second aspect is determined by the fact that it has as its task the protection of the various components of the natural and artificial environment.

In the same context, as anthropogenic pressures on the environment have increased over the last century, the need for systematic protection of the environment has increased. It has led to considerable experimentation regarding the measures used by mankind to achieve its protection objectives. Even though some of them have been successful, *the big picture is one of failure*. That is why a complex of human, rational and scientific activities based on protecting natural and artificial environmental factors is needed [2].

Although it has been established by law that the protection and development of the environment is a matter of national interest, the complex and difficult task of protecting the environment cannot be fully fulfilled by the state bodies, being necessary from this point of view the contribution of non-state organizations, individuals, and legal entities.

2.3. Issues related to the need for forest protection

Forests serve interdependent and multiple ecological, economic, and social functions, often simultaneously on the same territory. Protecting this multifunctionality requires a balanced approach to management based on adequate information from the forestry sector [3].

In the context of forest security and protection, it has been found that it would be indispensable to train specialised officers of the judicial police, since the bodies currently in charge of forest security and protection do not have clearly defined competences, about police units and gendarmerie, but also to other natural and legal persons [4].

Even if the actions of the forest fund and its management are provided for in the Forestry Code and in the provisions of the Criminal Code, the question arises of drawing up an Environment Code, which specifically regulates, in a unitary and appropriate conception, criminal liability for environmental damage, which could be much more effective in regulating and combating the damage generally caused to the environment, and especially the forests [4].

It is worth noting that environmental sustainability is one of the biggest challenges and most important targets of the current times [5]. It is the area of major attention for researchers, governments and non-governmental organizations involving individuals, communities, countries, continents, and the whole world. The fundamental concern of modern society is that while today's people enjoy economic comfort, future generations are on the verge of facing rare natural resources and a polluted environment. Our most important responsibility is to leave the planet as a sustainable auto system that offers equal chances of survival to our future generations and to all other species living with us. [6].

Despite all the efforts made so far, current policies cannot achieve the objectives of conservation and sustainable use of forests. Therefore, the intensification of measures to protect existing forests, the active and sustainable creation of new forested areas, and the sustainable management of forests must play a key role in Romania's sustainable development policies [7].

Thus, we can say that sustainable forest management would require two major actions. On the one hand, the protection of the current forests, and on the other hand, the development of the forest heritage [8].

Recently, there has been an increase in awareness of the importance of forests in various policy debates and in the context of the COP21 agreement in Paris -at the Convention on Climate Change in 2015 [9], where the topic of forests has been an integral part of the discussions on climate change. Regarding climate change mitigation and carbon sequestration, forests are perhaps the only natural tool we can manage. It is in our power to cut and grow forests, while on the oceans, for example, we do not have such control [8].

It calls for restoring, protecting, and promoting the sustainable use of terrestrial ecosystems, which support 'life on land', in the SDG 15 - Sustainable Development Goal plan. [10]. A key component of the FAO's monitoring of key indicators of SDG 15 by the FAO (Food and Agriculture Organization) is the overall assessment of forest resources, as reference data is reported and collected on trends in changes in the forest area and progress on sustainable forest management [11].

Although at present, more than half of the total, namely 2.05 billion hectares of forests, are the subject of management plans, and awareness of the importance of forests has increased in recent years, it is necessary that there be a partnership of to all nations of the world, the only one capable of ensuring an efficient and balanced global economy [11].

At the same time, the fact that Romania is committed to meeting the national and global objectives, regarding the protection of the forest fund and the sustainable management of forests, proves that it wants to improve the way it manages and protects the

national forest fund [12]. In 2017, the inclusion in 2017 of over 24,000 hectares of valuable beech forests in the UNESCO World Heritage List is an essential measure to strengthen the protection status of these forests, but also for the potential impulse that this measure will be able to generate, to ensure the protection of all virgin and quasi-virgin forests in Romania. The envelope of the measures regarding the sustainable management of the national forest fund, established in the National Forest Strategy 2018-2027 [13], will have as impact the increase of the area occupied by forests and forest vegetation of Romania [14].

3.1. General aspects of the Romanian forest fund

The main task of the Ministry of Environment, Water and Forests is to ensure that all logging in Romania is sustainable and that it is carried out without the destruction of the last old-growth forests on the continent and wildlife [15].

The state forest fund had a total area of 6,341,260 hectares in 1990. According to the National Forest Administration – Romsilva, the state's public forest fund has decreased considerably compared to the situation in 1990, because of the application of the laws on the reconstruction of the property right. Thus, as can be seen in Fig. 1, the national forest fund decreased from 6,341,260 hectares (1990) by 3,205,000 hectares to 3,136,000 hectares (2018), with a significant loss of 2,510,000 forest hectares between 2000 and 2010 [16].

As far as can be seen in Table 1, at the end of 2020, the public property represented a total of 64.3% of the area of the national forest fund being owned by the state (48.2%) and by the public administrations (16.1%), generally managed by the National Forest Administration – Romsilva. The total private property, 35.7%, owned by individuals or companies (34.2%), together with the one in the possession of territorial administrative units (1.5%) is mostly managed by private forestry structures.

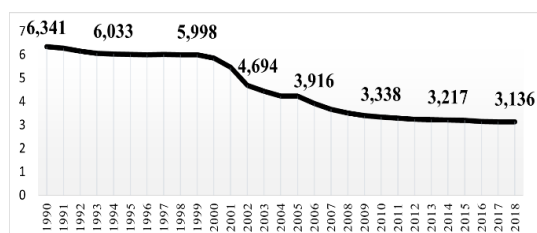


Fig. 1 – State of the state of the state-owned forest fund, 1990-2018 (Own graphics based on RNP – Romsilva http://www.rosilva.ro/articole/prezentare_generala_p_178.htm)

Table 1 – Forest structure, by forms of property, at the end of 2020

Owner - Romania		%	
Privat	Individual and companies	34,2	35,7
	Territorial administrative units	1,5	
Public	State	48,2	64,3
	Territorial administrative units	16,1	

Source:

https://insse.ro/cms/sites/default/files/field/publicatii/statistica_activitatilor_din_silvicultura_in_anul_2021.pdf

If only a little over half of Romania's forests are owned by the state, the Ministry of Environment, Water and Forests, it is to supervise the entire forestry fund, whether it is public or private [15].

The composition of the forest is varied; conifers represent 31% of the total forested area (23% spruce, 5% fir and other conifers 3%), beech 31%, oaks 18%, other hard deciduous 15% and soft deciduous 5%. In terms of tree cover, the area is larger (about 8 million hectares), the difference being given mainly by the reforestation of abandoned agricultural land [17].

According to the distribution of the forest fund area by counties, as of the end of 2018, the largest areas of forest fund were recorded in the north-east and south-west of the country: Suceava (438 thousand ha), Caras-Severin (428 thousand ha), Hunedoara (318 thousand ha). On the other hand, due to the desertification phenomenon of the land in these areas, the smallest areas of forest background were recorded in the counties in the south-south-east of the country: Calarasi (22,000 hectares), Ilfov (26,000), Ialomita (26,200), Braila (28,000) and Teleorman (29,000 hectares) [18].

3.2. The regime of protected natural areas in Romania (Natura 2000 Network)

The creation of protected natural areas is the most widespread and effective method of preserving highly natural forests and is the basis for nature conservation legislation in Europe. Around 12.2% of Europe's forests belong to protected areas (around 29.9 million hectares), but only 1.5% (around 3.1 million hectares) are under strict protection ('no active interventions'), according to the State of Europe's Forests Report 2015 [20] About two live from the strictly protected forests are in the Scandinavian countries of Finland and Sweden [21].

According to the report published in 2016 by WWF (World Wide Fund for Nature) "The state of implementation of the Natura 2000 Directives in Romania", the main problems found in this regard in Romania are the financial constraints in the management of protected natural areas, especially in terms of insufficient budgetary allocations for nature conservation, with the related limitations on the management structures and implementation of the necessary conservation measures, together with incomplete scientific data (especially on the species/habitats that are present in the Natura 2000 sites) and the inefficient communication and cooperation with the public and between stakeholders/institutions [22]

Although Romania has designated 583 Natura 2000 protected areas, covering almost 25% of its national territory, gaps have been identified in efficiently managing these valuable areas. The management of protected areas is affected by many factors, such as the lack of firmness and poor coordination of the Natura 2000 network at the central level, the low level of information at the local level on the rights and obligations of landowners/concessionaires located on

the protected areas area, underfunding and lack of compensation payments for landowners/managers. [23]

3.3. Threats to the forest fund

Based on the specific information, it can be said that there are the following threats to the forest fund: illegal logging - which is taking place at an unprecedented rate; the phenomenon of desertification, deforestation and forest degradation, which is not even slowed down; the natural environment degrades due to irresponsible forestry practices and the indifference of the authorities responsible for their protection. [24]. These results make the authorities accomplice in destroying Europe's most complex natural heritage. At the same time, the felling of trees due to urbanization, industrialization, mining, and the use of wood for domestic and other purposes has led to the massive depletion of forests. [25]

At the same time, many factors can lead to the degradation and deforestation of forests, which are the basis for the decline of the forest fund, as well as of the biodiversity in Romania, such as the lack of viable policies, poor governance, lack of law enforcement, illegal activities and lack of investment in sustainable forest management as well as urbanisation, infrastructure development and exploitation of natural resources, over-exploitation of ecosystems and species, loss of wetlands along the Danube, pollution, uncontrolled tourism, and last but not least trade in rare and threatened species. [1]

Consequently, the analysis of the information presented in this chapter reveals the following main problems of the forestry sector in Romania: the lack of an effective correlation of the legal provisions in the field of forestry with regulations in other fields and other ministries, such as the fiscal code, the criminal code, the civil code and the arms and ammunition regime, environmental protection, etc.; the legal framework, which is elaborated with emphasis on sanctioning the facts produced and not on the prevention of their occurrence; the existence of a significant area of forest for which forest management or services are not provided and for which no forest management plans are developed; lack of computerised records of forest land and of demarcations between owners; not updating the indicators for sustainable forest management in the European and national context; the underfunding of the sector, as well as the failure of the state to comply with its legal obligations under the legal provisions, as well as the lack of forestry education platforms and programs addressed to civil society and especially to children.

3. 4. Forest protection measures in Romania

Past forest management methods can influence current management and conservation measures. However, understanding the past management of forest ecosystems as well as how property evolves makes the

current forest technics based on sustainability and sustainability [26]

As regards the methods of forest management applied in the past, we have identified that Romania has lacked a forestry strategy in the field for recent years, as well as an impact analysis of the Forest Strategy of 2001-2010, which can thus affect the current forest management and conservation measures and may lead to the impossibility of setting well-defined priorities or an effective action plan based on previous experiences. However, it has undertaken several public policies relating to the conservation and development of forest resources (the 2005 National Forest Programme) and the fight against illegal logging by applying measures such as the introduction of illegal logging as a threat in the national security law (National Plan for Combating Illegal Logging).[27]

Forest protection measures include those measures of coercion and accountability of the perpetrators who attack the forest fund. Although these measures materialized and explicitly quantified at some point in various sanctions, they also represent a permanent challenge of regulating and adapting them to the evolution of society, the degree of perception of the distinction between good and evil and the level of social danger represented by facts in this forestry field.

At this moment in Romania, we have a basic regulation in this field, namely the Forestry Code (Law 46/2008), where the entire range of legal responsibilities is recorded, starting from the disciplinary, material, civil, contravention and criminal ones. It is worth noting that the sanctioning level (criminal and contravention) increases directly to the calculated damage. The calculations consider the value of the damage caused to the forest, to which is added to the value of the unrealized forest's functions. Special normative acts regulate these calculations.

The calculation of damages contributes to the recovery of the costs of restoring the affected forest fund to its original state and the individualization of criminal penalties. With all these calculations and sanctions meant to discourage the offenders, it is observed that the maximum limits for sanctioning forest crimes are between 2 and 7 years in prison, the usual limits being between 6 months and 1 year or a criminal fine. These limits can be added up to half of those limits for various aggravating described by law. Basically, the most serious criminal sanction can be up to 10.5 years in prison in case of exceeding 20 times the value of one cubic meter of unexploited wood.

There are also special regulations of forest contraventions through Law 171/2010, where specific sanctions are established (the same depending on the damage), which can be fines of up to 50,000 lei (about 10,000 euros), but also complementary contravention sanctions for confiscation of assets destined, used or resulted from committing the acts. These contravention sanctions are applied for the violation of the legal obligations regarding the forestry field and refer to: administration, arrangement, integrity, regeneration, exploitation or movement in this field.

The regime of these offences is influenced by the general regime of contraventions, which provides that it is possible to pay 1/2 of the amount of the fine if it occurs within 15 days of its delivery.

The disciplinary sanctions of the forestry staff are regulated by GEO (Government Emergency Order) 59/2000. In this normative act, in addition to establishing these disciplinary sanctions, we also find motivational elements and the protection of the forestry worker. At the same time, a special status of it is created, like that of policemen or gendarmes, invested with the exercise of public authority, corroborated with the provisions of art.257 para.(4) of the Criminal Code establishes the increase by half the limits of the penalties for the crimes committed against such persons. In addition, forestry personnel have a special status in exercising their duties in forests, hunting, fisheries and protected areas. They are equipped with lethal or non-lethal armaments, as the case may be, in accordance with the legal regulations on the arms and a munition regime.

Other generic obligations regarding the forest fund are regulated under GEO 195/2005 on environmental protection.

IV. FOREST BACKGROUND SITUATION IN COUNTRIES OF THE EUROPEAN UNION

4. 1. European Forest Fund

As shown in Fig. 3, the European forest fund is constantly growing. The forest fund grew between 1990 and 2020 by about 0.29 million square km, that is, by 29 million ha. It represents an increase of about 23% from about 130 million hectares to about 160 million hectares of forest. Thus, forested land in Europe accounts for about 5% of the world's forest area. In parallel, the 4% increase in forest coverage of the total area of the European Union is also observed, from 35.93% to 39.84%. In comparison, there is a reverse phenomenon worldwide, of a 1% decrease in the share of forest cover, from 31.6% in 1990 to 30.7% in 2016, according to World Bank statistics.

Unlike many regions of the world where deforestation remains a major problem, it is worth noting that the European Union's forest area is increasing, thanks to afforestation policies and the conversion of abandoned agricultural land into forests or by self-regeneration [28].

The largest forested areas of the Member States are Sweden and Finland with forest cover of more than 60% of their national territory (Fig.4)." Romania has about 29.3% of the territory covered with forests. To reach or even to exceed the European average of 40% it will have to comply with the strategies in the field (European Forest Strategy 2030), newly adopted and consider the examples of the states that manage their forests and protect them more efficiently. For the analysis of good practices, we consider Sweden and Austria.

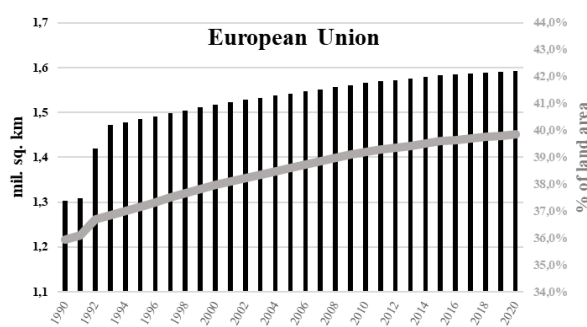


Fig. 2 - The evolution of the European forest fund between 1990 and 2020 (Own graphics, based on <https://data.worldbank.org/indicator/AG.LND.FRST.ZS>)

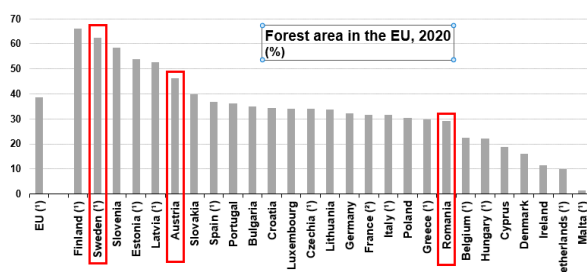


Fig.4 - Percentage of forest area in national areas in the EU (Eurostat source - https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Forests,_forestry_and_logging#Forests_in_the_EU)

4.2. EU involvement in forest protection

Although there are currently many European Union decisions and regulations in the field of the environment, the effectiveness of European environmental policies is largely determined by their implementation at the national level. Thus, forestry policy remains primarily a national competence [7], the European Union only adopts European forest strategies and supports a series of measures that have a significant impact on European countries. The European Union also has the competence to act in all areas of environmental policy. It seeks to identify the best way to manage forests in Europe, ensure that they are managed sustainably, and strengthen the Union's contribution to promoting sustainable forest management and combating global deforestation. At the same time, within the European Union's environmental policy framework, the nature protection network "Natura 2000" was created in Directive 1992/43/EEC and Directive 2009/147/EC [29].

In its regular package of infringement decisions, the European Commission continues legal action against Member States for failing to comply with their obligations under Eu law, such as Romania (stopping illegal logging), Germany (improving the rules for the protection of surface waters against pollution), Greece and Malta (need to adopt national air pollution control programmes) [31]. These decisions, which cover different sectors and policy areas of the European Union, aim to ensure the correct application of European Union law to benefit citizens and businesses. The Commission identifies possible breaches of EU law under its own investigations or following

complaints from citizens, businesses and other stakeholders [32]

As I mentioned, Romania was urged by the European Commission in 2020 to stop illegal logging by properly implementing the EU Timber Regulation [33]. It also called on Romania to take the necessary measures to better protect and manage its Natura 2000 network, thus complying with its obligations under the Habitats Directive (Council Directive 92/43/EEC of 21 May 1992), [31].

4.3. Situation and forest protection measures in Austria

Austrian forest land, according to Fig.4, increased to approximately 4,000,000 hectares, representing 47.6% per cent of the country's land area or half a hectare per capita [34].

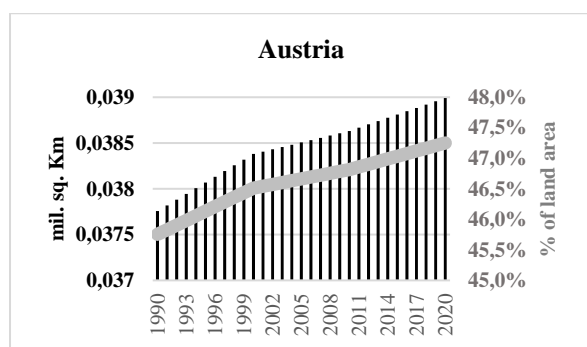


Fig. 5 - Forest area in Austria between 1990 – 2020 (Own graph based on <https://data.worldbank.org/indicator/AG.LND.FRST.ZS>)

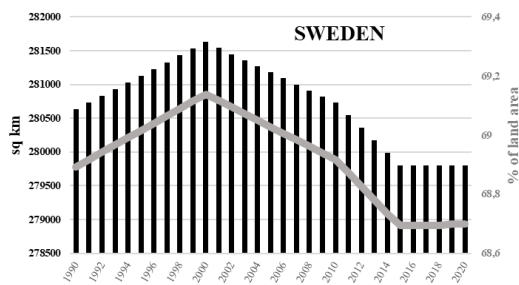


Fig. 3 - Forest area in Sweden between 1990-2018 (% of area) Source: Own graphics, based on FAO, <https://data.worldbank.org/indicator/AG.LND.FRST.ZS>

Austria's forest fund has steadily increased since 1990 from 3.78 million hectares to about 4 million hectares today, also increasing the percentage of forest occupancy in the country's surface, from 45.8% to 47.6%. In addition, 30% of Austria's forests (1.2 million ha) are declared protected forests.

According to agricultural and forestry statistics, Austria has about 214,000 forestry holdings, of which 140,000 are less than 5 hectares; 57,000 forest holdings are between 5 and 20 ha; 12,000 enterprises are in the category from 20 to 50 ha; 4,000 forest holdings range from 50 to 200 ha; and about 1,000 enterprises are larger than 200 ha. The total area of the Austrian forest is classified into six distinct categories, in terms of forest ownership (Table.1), [35].

Table 2 - Forest ownership structure in Austria

Owner - Austria		%	
Privat	Private forests under 200 ha	48,20	80,38
	Private forests over 200 ha	21,26	
	Common rural property	10,92	
Public	Communal property	2,07	19,62
	Provincial governments property	1,87	
	Austrian Federal Forests SC and other public forests	15,68	

- Source:

https://facesmap.boku.ac.at/library/FP1201_Country%20Report_AUSTRIA.pdf

Table 3 The structure of swedish forest owners – Source: <https://www.skogsstyrelsen.se/en/statistics/subject-areas/ownership-structure/>

Owner - Sweden		%	
Privat	Individual owners	48	78
	Private-owned limited liability company	24	
	Other private owners	6	
Public	State	8	22
	State owned companies	12	
	Other public owners shareholders	2	

Forest cover in Austria has been steadily increasing for several decades by about 5,100 ha/year. This is mainly due to the fact that former agricultural land, such as mountain pastures, pastures or meadows, have once again become forests. Even landfills become reforested [36].

In Austria, satisfactory forest management can only be carried out with well-trained foresters, and that is why forest education and forestry research have such a long tradition in Austria. There are different levels of forest education: the training of forest guards takes a year at a forestry school. The tasks of forest guards mainly include guarding and supervising forests. Foresters are trained at two technical forestry high schools for five years and require a final examination under federal supervision after a two-year practice. They are employed in enterprises between 500 and 1,800 ha at supervisory level; enterprises of over 1,800 ha are required to hire graduates from the university of agriculture. After a three-year practice, he must pass an exam under federal supervision [34].

4.4. Forest protection measures in Sweden

Sweden is often seen as a leader in terms of forest sustainability. It is sparsely populated and 70% of its land area is covered by forests [37]. The Swedish Forest land is around 28 million hectares [38].

Between 2000 and 2014 there is a decrease of about 0.44% from the maximum in 2000. Since that decrease in 2014, Sweden has seen the percentage of forested area in the national area remain constant at the same level. Due to the increase until 2000 of 0.22% and the decrease of 0.44%, it results in a cumulative decrease of 0.2% between 1990 and 2020. However, the level of the forest fund remains at the same percentage, with little progress, reaching now up to almost 70%.

Sweden is also characterized by a relatively high percentage of private forests according to Table.2. About 78% of the country's forest land is owned by private forest owners and the remaining 22% by the state.

"Swedish system involves binding laws, non-binding 'advice', and certification schemes, which sometimes are difficult to coordinate for the purpose of facilitating implementation." [39].

The Swedish Forest model is built on renewable forests, so that when the exploitation of old forests is finished, a new forest is created. When the forest is young and middle-aged, it grows the fastest, thereby absorbing more carbon dioxide from the atmosphere. By monitoring and using modern technology, forest experts identify the trees that should be harvested and the trees that should be left behind [40].

"The Swedish Forest Agency is, at present, revising its monitoring system and has suggested increasing supervision of planned forestry activities" [39].

V COMPARATIVE ANALYSIS OF EU COUNTRY DATA PRESENTED AS EXAMPLES (ROMANIA, SWEDEN, AUSTRIA)

The analysis based on square kilometres or hectares of forest is not relevant from the perspective of the reference to the value of the total forested area in the EU, areas that were modified during the analysis period (1990-2020) by the accession of several states to the EU.

We believe that the evolution of the percentage of forested areas in the areas of the exemplified countries is much more relevant, the EU reference remaining in this case a constant.

It is observed in Fig.7 the percentages of forest areas of the countries analyzed and their evolution between 1990-2020. If at EU level there is a positive evolution of 3.9%, respectively 2.3% for Romania, respectively 1.5% for Austria, Sweden registers for the same period a negative evolution of 0.2%.

In practical terms, it highlights a trend of a steady increase in the percentage of national areas, implicitly reflected in the cumulative average percentage at EU level. The only remarkable anomaly from this upward trend is observed in Suedia This decrease, did not affect the leading concentration of the forester surface within the EU, Sweden maintaining the second place, after that of Finland in this ranking, as we have already seen in Fig. 4.

Analyzing the information presented in this chapter, we have discovered some measures implemented by Romania that are identical to those adopted by Austria and Sweden, such as: setting up sites/applications for storing wood (SUMAL Application 2.0), strengthening, maintaining and promoting biodiversity in forests (sites "Natura 2000"), granting subsidies to forest owners (it is granted in Romania if forest owners have more than 100 hectares and do not exploit the forest).

Table 4 Comparison between forest ownership structures

Owner	Romania	Austria	Sweden
Privat	35,7%	78,0%	80,4%
Public	64,3%	22,0%	19,6%

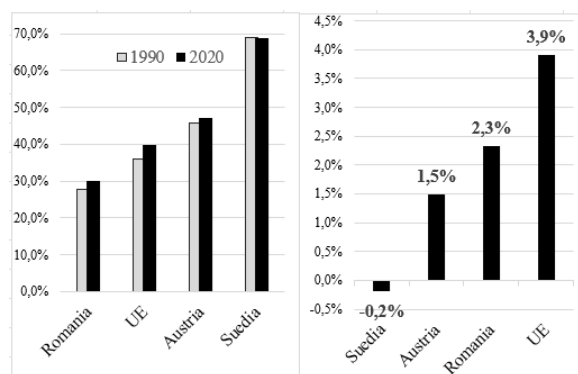


Fig.7 – Differences in the evolution of forest areas

The table shows that the form for Austria and Sweden, the form of private property of forests is 3-4 times larger than the public one, and in Romania the private property is about 1.5 times smaller than the public property. From another perspective, it can be said that the percentage of private property of forests in Romania is twice as low as in Austria and Sweden, and the percentage of public property in Romania is about three times higher than in Austria and Sweden.

V. CONCLUSIONS

At first glance, it could be concluded that there is a cause of effect link between the form of ownership and the evolution of the percentages of forest areas. It could be said that the majority public property administered by the state of Romania directly determines a more pronounced increase in the forested area. But, if we observe that the increase of the forest area in Romania is directly proportional to the decrease in the share of public property, we conclude that private property stimulates the growth of the forest area, which is also confirmed by the average increase at EU level.

Strictly regarding the situation in Romania, we note that perhaps an increase would not have been possible due only to the gradual transfer of the form of ownership, if this transfer had not been strategically accompanied by government measures regarding the protection, conservation and development of the forest fund, complemented by more drastic sanctioning measures, which have evolved and adapted over time. Moreover, these good practices already carried out by Romania can be completed by the measures taken by Austria and Sweden, which aim to:

- Establish a distinction between protected forests, which need protection (due to the dangers to which they are exposed) and protective forests, which protect people and their settlements (from floods, landslides, rockfalls, etc.);

- The formation of well-trained foresters (preparation the professional training of forest workers and the training of forest guards), because only through them can satisfactorily forest management be achieved (that is why forest education and forest research have such a long tradition in Austria);
- Afforestation of former agricultural land or former landfills;
- Reforestation by repopulation with plants of origin, wherever natural regeneration cannot produce seedlings;
- Obliging forest owners to replace all directly felled trees by planting new trees, sowing or natural regeneration at the latest by the third year after harvesting;
- Obliging forest owners to ensure that rare plants and animals, rare biotopes, large trees, old/dead trees, and protection zones adjacent to lakes and watercourses are protected as much as possible.

Of course, these proposed measures are only a component for combating the phenomenon of the degradation and deforestation of the national forest fund, although the legislation largely fulfils its role, there is also a need for political will and power in the implementation of European strategies, money allocated by the EU. Such a pillar of forest area growth is at the beginning of the road. It is about creating forest curtains for the protection of agricultural fields against desertification. Recently, through the National Recovery and Resilience Plan (NRRP - PNRR). It offers the possibility of full funding from EU funds with 500 million euros for the establishment of 56,700 hectares of forest, according to the Afforestation Financing Guide (<https://www.primaimpadurire.ro/ghid-impaduriri-pnrr/>).

As seen from Fig.8, the potential for applying this strategic measure is real in the southern and eastern part of Romania's territory, on the less colored areas. More intense color means a greater concentration of forests. From an example of the situation of the forests in Sweden and Austria, they develop more strongly in mountainous areas or cool areas in the north of the continent (the case of Finland). Romania has in the mountainous and sub-mountainous area only three counties (Suceava, Hunedoara and Caras-Severin) that have a maximum density of forests, having many other mountainous and sub-mountain areas where forest development is conducive. In addition, by this usual development, Romania can forest more intensely (more intensely colored) about 25%-30% of the territory in the south and east of the country that is mainly a plain area, with forest curtains for crop protection.

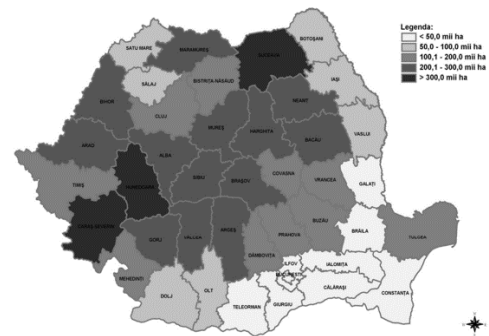


Fig. 8 Forest fund by county at the end of 2021 (National Institute of Statistics -

https://insse.ro/cms/sites/default/files/field/publicatii/statistica_activitatilor_din_silvicultura_in_anul_2021.pdf)

Crop protection is manifested not only by blocking winds, blocking the emergence of sand (desertification), stabilizing the soil against landslides, but also by retaining in the soil a larger quantity of water that by limiting evaporation in the shade of trees, while obtaining a moderate microclimate in arid areas with constant heat. The generic contribution of all forests, including protective curtains to the absorption of CO₂, is not to be neglected. From this point of view, the forest curtains can also be set up in the perimeter of the metropolitan areas, which will develop continuously in the next 40 years, "adding to the world one Paris every week" [41]. This will be a major benefit to increasing people's health, both physically and mentally.

In addition to the aspects of a strictly forestry nature [42], in the context of globalization, the unitary approach and interconnected with the Global Sustainable Development Goals (SDGs, <https://sdgs.un.org/goals>) must also be considered. These are intertwined with the objectives of the European forestry strategy, from which the following policies based on the indicator result, but also recommended good practices that can be applied to forest development in Romania.

These strategies are based on indicators [44] and threats that determine policy approach (https://environment.ec.europa.eu/topics/forests_en).

The policy chapters contain:

1. Deforestation and forest degradation are the greatest threats to forests, contributing to climate change, loss of jobs, energy, economic value, soil degradation, damage to human health, etc. .

2. Monitoring (studies, reports, maps - current and accurate information) for correct and reliable decisions and useful in responding to climate change, preserving and restoring biodiversity and developing the bioeconomy.

3. Forest fires – in 2021 22 of the 27 EU countries suffered forest fires, affecting over 5500 square km, of which, over 1000 square km of protected areas

The policies supported by the indicators have clearly determined objectives, achievable by the proposed measures that must also be applied in Romania.

1. "Promoting sustainable forest bioeconomy for long-lived timber products
 - Investments along the woodworking chain
 - Support for the adaptation of industries to changing forests
 - Incentives for wooden constructions
 - Regulations for long-term timber products: energy/environmental performance, eco-labels,
 - Roadmap to reduce carbon emissions in buildings
2. Ensuring the sustainable use of wood-based resources for bioenergy
 - Sustainability criteria for biomass energy
 - Minimize the use of whole trees for energy
 - Strengthening the sustainability guarantees of forest bioenergy
 - Limitation of State aid for plants using only electricity
3. Promoting the forest-based non-woody bioeconomy, including ecotourism
 - Coordinated programmes on the sustainable production of non-wood forest products
 - Promoting collaboration in the field of ecotourism with sustainable tourism products, especially in protected areas
4. Developing skills and empowering people for a sustainable bioeconomy based on forests
 - Develop programs, knowledge, and skills
 - Promoting education on the role of forests
5. Protecting the last remaining primary and old forests in the EU
 - All primary and old forests are strictly protected - Maintains natural processes in primary forests, limiting extractive human activities
6. Ensuring forest restoration and strengthening sustainable forest management for climate adaptation and forest resilience
 - Key management practices to support biodiversity and resilience through species diversification, regeneration and the creation of new genetic resources
 - Risk management practices to increase forest resilience
 - Prevent climate-related damage and increase endurance
 - Monitor the health of trees and encourage preventive actions
 - Pest control strategies
7. Reforestation of biodiverse forests
 - Increase the area of the forest and with it, the absorption and stock of carbon
 - Plant 3 billion additional trees (AT EU level)
8. Financial incentives for forest owners and managers to improve the quantity and quality of forests in the EU
 - Incentives to strengthen protection and restoration efforts also in public forests
 - Incentives to provide ecosystem services and increase resilience, with payment schemes for ecosystem services
9. Strategic monitoring of forests, reporting and data collection
 - Forest management plans (FMP) for all public forests and several private forests
 - PMFs include risk assessment and management and better integrate biodiversity data
 - Establish criteria to ensure that THE FMP meets the strategists' objectives on climate, biodiversity, bioeconomy and social and rural development
10. A strong gene of education, research and innovation to improve our knowledge of forests
 - Promoting a science-based contribution of EU forests to the ambitions of the European Green Deal
 - Strengthening knowledge on the impacts of climate change to provide guidance for climate change mitigation and adaptation in line with biodiversity targets
 - Holistic approach to new and emerging pests and diseases" [44]

Through this case analysis, combined with the strategic forestry measures of the EU 2030, we highlighted the major potential for increasing the forest areas that Romania has through measures at hand or connected to European funding.

On the other hand, the daily signals give rise in the collective consciousness to a slow application of the recommended good practices, largely a process slowed down by bureaucracy, the lack of a flexible, digitized and efficient administrative personal structure, adaptable to changes and incorruptible. To the same extent, the legislation on the status of the forestry worker can be improved so that incorruptibility becomes an effect of motivation and not a coercive requirement. Regulations can be leaner, clearer, and more logical so as not to create confusion. Ensure better coordination of the Natura 2000 network. Providing information-promotion platforms and programmes for forestry education addressed to civil society and especially to children, more targeted from the point of view of communication marketing, so as to create a correct, objective perception of the importance of the forest and of the need to respect and implement the recommended measures.

At the same time, given the information presented in this work, one can support the obvious role of the forest in the context of our survival. From the air we breathe to the wood we use, we depend on forests for our survival. In addition to providing habitats for animals and livelihoods for humans, forests contribute to the physical and spiritual health of man, to the economic development of the country, through the economic function it performs, as well as to the conservation of soil through forest ecosystems, preventing soil erosion, mitigating climate change. So, for the forest to protect us, it needs our protection,

because by neglecting it, all the benefits offered by it can be canceled.

Therefore, both in terms of economic development and nature conservation, Romania has the advantage of accessing and using the EU's experience, as reflected in the increase in the percentage of forest areas. Thus, to reach the European standards regarding the forest fund, Romania can borrow and apply measures that have as object the protection, management, and sustainable development of forests, from other Member States of the European Union. The impact that these measures can have on the environment and especially on forests in Romania, can lead to: improving and maintaining the biodiversity of forest ecosystems; increasing the area occupied by forests and forest vegetation; achieving the national system of forest curtains by placing them along agricultural and metropolitan land, stimulating the use of high-performance wood harvesting technologies with low environmental impact.

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