
THE ECONOMIC COMPONENT OF THE DECISIONS REGARDING THE USE OF FOREST RESOURCES IN ROMANIA

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Abstract

At present, the forest area is registered at 97,6% of the national forest fund (INSSE, 2016), while the national forest fund occupies at the end of 2016 an area of 6.559 thousand hectares, representing 27,5% of the area country. At December 31, 2016, compared with 2015, the surface of the forest fund registered a slight increase of 4.000 hectares, mainly due to the redevelopment of the forested pastures and the introduction of the degraded land in the forest fund, under the conditions of the Law no. 46/2008 regarding the Forest Code, republished, with the subsequent modifications and completions (NEPA, 2017).

For analysis of illegal logging the authors have chosen method plotting on the map. The maps are made using a tabular calculation editor on which we superimposed map of Romania. There are a variety of tools to do this. The novelty is that we chose to realize ourselves that without calling me to cartographers or expensive software. Our objective was to highlight the geographic regions in Romania where deforestation registered significant values and these values correlate with the geographical area and population density.

Keywords

deforestation, forest code, environment protection.

JEL Classification

Q23, Q56, Q58

Introduction

The national forestry fund is made up of all forests, ponds, lands for afforestation, for cultivation, but also lands that do not contribute to the forest area although they are included in it (Lupan, 1997), the ownership is irrelevant (According to art.1 Forest Code). According to the Forest Code, forests are defined as land not exceeding 0,25 ha, covered by vegetation (According to art. 2 of the Forest Code).

The area of forests increased in 2016 (when it occupied 6.404 thousand hectares) compared to 2015, by about 0,08%, but decreasing compared to the interval 2015-2014, when the increase was about 0,2%. The main reason for these increases is due to works of redevelopment of forested pastures and afforestation of degraded land and vegetation. Thus,

the regenerated area of forests decreased by 2,6%, respectively by 294 ha, from 28.750 ha in 2015, to 28.456 ha in 2016 (INSSE, 2016).

For the year 2016 there were decreases of the wood harvest compared to the previous year by 935.000 hectares (Table no. 1), due to the reduction of the treatments for forest rejuvenation (INSSE-1, 2016).

Table no. 1. Evolution of key indicators in 2016 compared to year 2015 (hectares)

Indicator name	Million hectares				Differences		
	2013	2014	2015	2016	2014 vs. 2013	2015 vs. 2014	2016 vs. 2015
Total forest fund	6,539	6,545	6,555	6,559	(+6.000)	(+10.000)	(+4.000)
Foreground of forests	6,381	6,387	6,399	6,404	(+6.000)	(+12.000)	(+5.000)
The wood harvested	-	-	18,133	17,198	-	-	(-935.000)
Surface covered with regeneration cuts	-	-	0,098	0,137	-	-	(+38.765)
Cutting	-	-	0,005	0,004	-	-	(-858)
Surface regenerated	-	-	0,0287	0,0285	-	-	(-294)

Source: INSSE-1, 2016, ANPM, 2017

Analyzing the data in the table above, there is an increase in the area of the forest fund by 10.000 hectares in 2015 compared to 2014 and by 4.000 hectares in 2016 compared to 2015, as well as an increase in the forest area by 12.000 hectares, respectively 5.000 hectares, in the two time intervals.

One can say that the forest area and forest area grew less in 2016 compared to 2015 the previous year. In addition, the harvested wood fell by 935.000 hectares, decreasing at the same time the surface regenerated by 294 hectares in 2016.

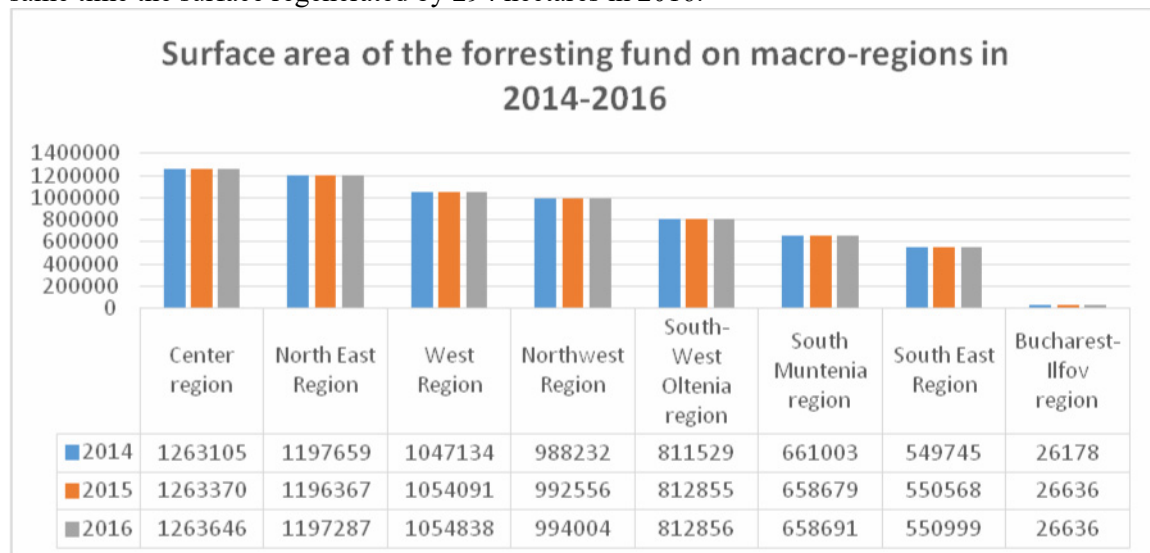


Figure no. 1. Area of the forest fund by macro-region in 2014-2016 (hectares)

Source: INSSE, 2017

According to the chart above, the largest forest floor area is in the Center region, which has seen increases over the past 3 years from 1263,105 thousand hectares in 2014 to 1263,646 thousand in 2016 (Figure no.1).

Positive developments, in terms of surface, also met the West, Northwest, Southwest Oltenia and South East regions.

In the North-East Region, the forest area recorded decreases in 2014, amounting to 1.197.659 thousand hectares, and in 2015 it decreased to 1.196.367 thousand hectares. Also in the South-Muntenia region, the area of the forest fund has decreased from 661 thousand hectares to 658. 691. The smallest forest area is located in the Bucharest-Ilfov region where it has stagnated in the last two years to a value of 26.636 thousand hectares.

Of total forest of 6.559 hectares in 2016, 6.404 hectares were covered by forest land, among which were the following species:

- Softwood: 1.929 thousand hectares (29,4%)
- Hardwood: 4.475 thousand hectares (68,2%)
- Other forest lands: 155 thousand hectares (2,3%) (INSSE - 1.2016)

According to the data presented in the previous table, it can be noticed that the area of softwood forests during the years 2012-2016, although it did not change greatly, registered almost constant decreases, the largest being in 2013 compared to 2012, with 8.000 hectares, but also in 2014 compared to 2013, down by 7.000 hectares.

Small surface changes during the years 2012-2016 can also be seen in the case of deciduous forests, but having a growth rate starting in 2012 from an area of 4.428 thousand hectares and reaching 20.416 in 4.475 thousand hectares.

1. Literature review

The state of forest health

The wooded area suffers some changes that are detrimental to its development. These changes are made by factors such as:

- abiotic factors that include climatic, pest, fire, dust and gas as well as toxic gases;
- biotic factors that include harmful phytopathogenic insects and cryptograms

agents.

In spruce forests, the existence of pests is reduced due to the cold climate, the only affected trees being injured or injured; and in the case of oak trees the oak is found, hundreds of hectares being affected by it (Bran, Cimpoeru, Candea, 2006).

It was found that in 2016 the wooded area was affected by different pests. As can be seen in Figure 2, they are: the action of insects, mushrooms, biotic agents, anthropogenic factors, atmospheric pollution, etc. The highest share is held by defoliant or xylophage insects, with 53,7% for deciduous trees and 49,8% for all trees. In contrast, the ratio between insects and fungi is about 25,5%, compared to 21,3% (MAP, 2016).

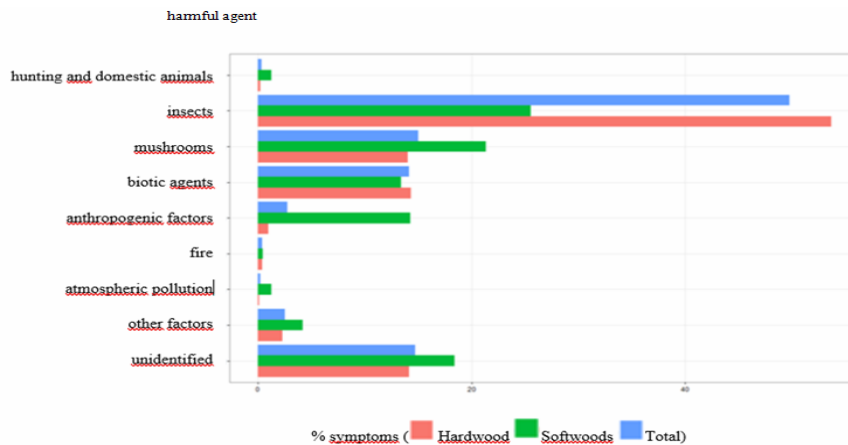


Figure no. 2. Symptoms distribution by types of forest pests

Source: MAP, 2016

Another major cause of the premature drying of the trees was climate change, which led to the appearance of extreme weather phenomena, which besides the drought were excessive temperatures, abundant rainfall, early or late frost etc.

As a result of the drought, conditions favorable to the development of insects and cryptogamic agents have been created, which have attacked the trees and contributed to their drying.

Among the species heavily affected by droughts can be found the softwood stands outside their natural range, especially those in the eastern part of the country, where the precipitation deficit was the most pronounced, as well as some deciduous species such as oak, oak, ash etc. (ANPM, 2017).

A factor that has caused aggressive forest pollution is industry, growing increasingly in the second half of the 20th century, removing airborne harmful substances into the green space such as: sulfur dioxide, fluorine, lead, zinc etc. After all the pollutants are summed up, there are identified severely affected forest areas such as Ploiesti, Copșa Mică, Baia Mare, Suceava etc., where the health of the trees and the regeneration capacity of the trees are greatly affected.

Due to the lack of water and excessive heat, the forest area in the south of the country is severely affected, a phenomenon common in steppe areas. Thus, as shown in Figure 3, counties in the south and south-east of the country: Teleorman, Giurgiu, Calarasi, Ialomita, Constanta, Braila, Galati and Bucharest Ilfov record forest areas less than 50.000 hectares at county level. In the year 2016, in the following counties: Suceava (438.000 hectares), Caras-Severin (421.000 hectares) and Hunedoara (317.000 hectares) and 200.000-300.000 hectares in the counties: Arges (277.000 hectares), Vâlcea (271.000 hectares), Bacau (270.000 hectares), Harghita (264.000 hectares), Neamț (262.000 hectares) and Maramureș (260.000 hectares) (INSSE - 1, 2016).

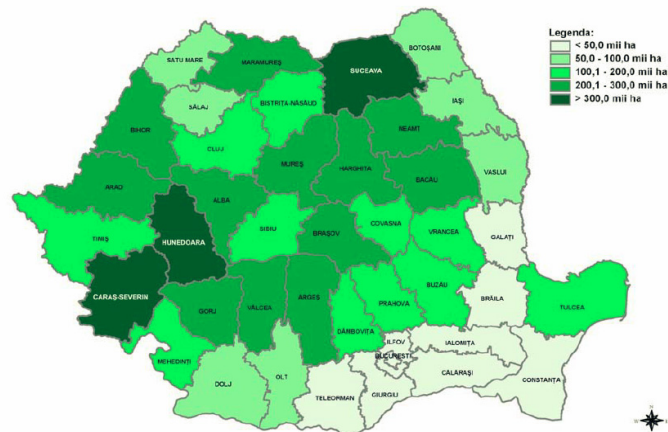


Figure no.3. Area of the forest fund by counties in 2016

Source: INSSE – 1, 2016

According to a study on the health of the green space in high areas, there was a decrease in the proportions of the affected trees inversely proportional to the altitude; once the 1500 m threshold is reached, the proportion of affected trees increases.

Forest, state and private property

The property is public or private (Article 135 of the Constitution). The State and its territorial administrative units may own land and are privately owned, so that state property may be public or national property (Article 6 of the Land Fund Law 18/1991).

2. Research methodology

2.1. The forestry fund belonging to the territorial administrative units

Due to the implementation of the new Forest Code in 2008, the forested pastures belonging to the private territorial administrative units were subsequently included in the total area of the forest fund. In 1989, the Romanian state was the owner of the 100% forest. As a result of applying the restitution laws for forest areas, a ratio of about 50% of state ownership, managed by the Romsilva National Forestry Registry and 50% of the forest owned by other owners, natural or legal persons, has been reached.

Legal entities are represented by associations or foundations, worship units and other forms. Prior to the application of the retrocession law of forest areas, more than 300 ha of forest belonged to the worship units, and after retrocession in 2011 it is reported that the worship institutions have an area of 139 thousand hectares (Bouriaud, 2013).

The average area of forests owned by individuals prior to nationalization was 3.1 hectares, after the 18/1991 law of the restitutions was 0,56 ha and after the application of the law 1/2000 was 2,2 ha.

An evolution (1947-2016) of the forest fund by forms of ownership varies greatly.

It is noticed that as compared to 1947, in 1990 the surface area of publicly owned forests of the state increased by approximately 3,4 times, continuing to decrease continuously until now. The highest decrease is seen in 2013 (versus 2000), the year when the state's public forest area reached almost half. The decrease continued until the end of 2016, when an area of 3.194.000 hectares was recorded.

Regarding the surface of public forests belonging to the territorial administrative units, this has diminished compared to 1947, as it can be seen in the Table no.3, but stabilizing over the last years to a value of about 1.050 thousand hectares. Instead, they have increased the private-owned forests of natural and legal persons since 1947 until now, and those in the

private property of collectivities have reached a very low value, about 7% of what is recorded in 1947.

A comparative illustration of the distribution of the forest surface area by ownership forms in the years 1947, 2013 and 2016, can also be seen in Figure no.4.

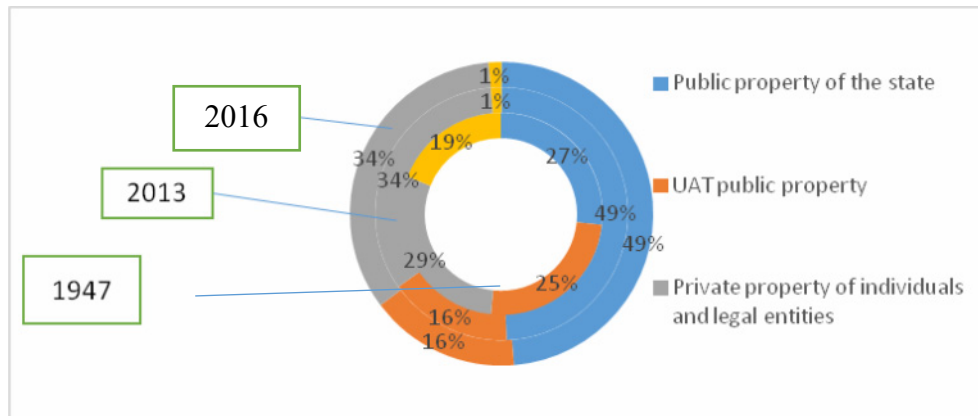


Figure no. 4. Distribution of the forest fund by forms of ownership in the years 1947, 2013 and 2016

Data source: ANPM, 2017

The main findings

2.2. Anthropoc pressure through illegal cuts

In the year 2016 there were 9.444 cases of illegal cuts across the country, of which 5.222 constituted criminal offenses, amounting to an average of 26 offenses and criminal offenses per day.

Although this value is high, the figure is still a 47% decrease compared to a total of 34.870 registered in 2015, when the average indicated a value of 96 cases of illegal cuts per day (peak value recorded in the last 8 years) compared to 62 cases per day in the years 2013/2014, when the authorities recorded 45.509 cases of illegal cuts (in 2 years), respectively 22.755 cutting cases on average in each of the 2 years (Greenpeace, 2015, 2016).

3. Results and analyzes

The data in Table no.2 highlights the counties of the country, in alphabetical order, for which the number of cutting cases in the 3 years is indicated.

Table no. 2. Area forest fund area and number of illegal cuts in the three years

County	Forest Fund Area (ha)	Number of cases of illegal cuts		
		2013/2014	2015	2016
Romania	6.555.112	22.755	34.870	9.444

Source: INSSE, 2017

For analysis of illegal logging we have chosen method plotting on the map. The maps are made using a tabular calculation editor on which we superimposed map of Romania. There are a variety of tools to do this. The novelty is that we chose to realize ourselves that without calling me to cartographers or expensive software. Our objective was to highlight the geographic regions in Romania where deforestation registered significant values and these values correlate with the geographical area and population (population density). Our

suspicion was that the size of population and geographical size, relative density forests are directly proportional to the number of cases of deforestation,

At first sight, we find that our suspicion is partially validated. If initially we assumed that most illegal forest cuts are made in high areas, the map shows that there are several counties, such as Dolj and Olt, which although they are located in low altitude areas, record high values in deforestation illegal.

The similarity with Greenpeace's maps confirms that the tools we use are properly used and calibrated. Over the map of deforestation we chose to overlap the population density. The map made by us using the spreadsheet utility is shown in figure no.6.

For the understanding of the deforestation phenomenon, we have also taken into account the density of the forest fund. On the map made by us, the density of the forest fund is presented as follows (figure no.7).

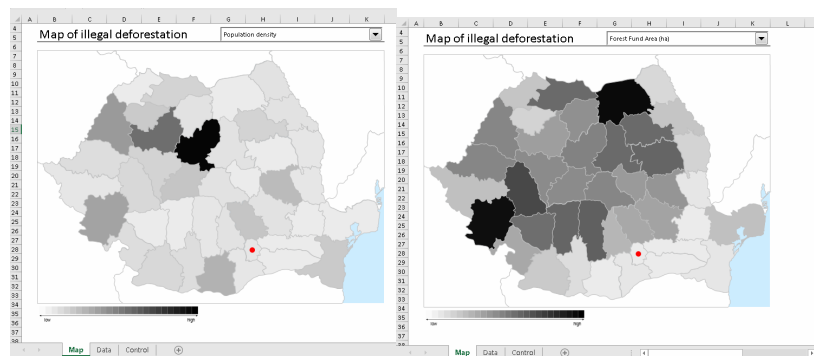


Figure no. 6. The map of illegal deforestation - 2016 and the forest fund area

Source: Own contribution

The overlapping of the cases of illegal cuts in the years 2014, 2015 and 2016 over the population density and the size of the forest space reveals that only partially the dependence of the cases of illegal deforestation on the population number and the afforested area is confirmed (Figure no. 7).

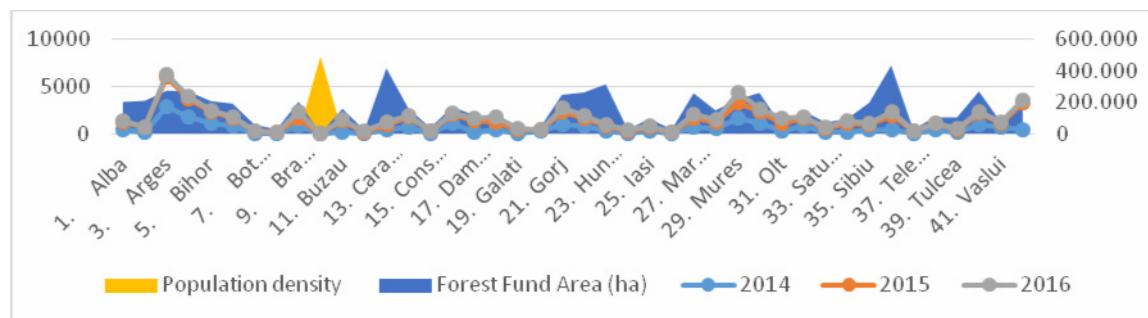


Figure no. 7. Illegal logging in forest area and population density

The volume of illegal logging of timber from forests

In 2016, they harvested 17.198 thousand m³ (gross volume) of wood, 935 000 m³ less than in 2015. The volume of timber harvested in the last four years can be seen in Table no. 3.

Table no. 3. Volume of harvested wood in the period 2013-2016

The year	2012	2013	2014	2015	2016
Volume of harvested wood - total (thousand m ³)	19.081	19.282	17.889	18.133	17.198

Source: INSSE, 2017

In 2016 the volume of timber harvested was 9,9% lower than in 2012. Figure no.10 below shows the development in timber harvesting between 2012-2016.

It shows a considerable decrease in wood harvesting periods 2013-2014 and 2015-2016 and a slight increase in the periods 2012-2013 or 2014-2015.

Conclusion

The volume of wood that is harvested each year from forests

This volume is predominantly foreseen by the forestry arrangements, and the method of calculation is made according to the volume of wood that is harvested, specified by the forest arrangement and depending on the life of the forestry arrangement.

There are also unforeseen situations where the possible volume of harvested wood is higher because the surface that has been affected by storms, invasions of insects and drylands is increasing compared to the annual harvest volume. This is only allowed through the authorizations given by the competent bodies managing the situation in the forestry.

The factors that determine the total volume of illegal cuts are the volume of deforestation and the amount of compensation. The method of calculating the volume of deforestation is based on the incomes from the harvesting of the wood and those from the deforestation.

The volume of illegal logging of timber from forests

In 2013, the value of illegally extracted wood from the forests caused a damage of almost 4 million euros, namely 17.400.600 lei to the Romanian state, amounting to a volume of 120.890 m³ of wood. The county where the largest volume of 21.140 m³ was extracted is represented by Maramures, and in three other counties the volume of de-scaled wood has reached the threshold of 10,000 m³. Therefore, according to official data, the volume of illegally cut wood in Romania during 2009-2012 was 201.432.901 m³.

According to the National Institute of Statistics, which provided data from 2012 on the volume of legally harvested wood, it results that it was harvested by 380 m³ more than the previous year. In 2012, 19.080 thousand m³ were harvested. Compared to 2008, the legally harvested volume of logs registered an upward trend of 15%. The same ascending trend is also found during the period 2009-2012 with a percentage of 10%, the rise period being 2010-2011 (National Institute of Statistics - Statistics of Forestry Activities in 2012-2013).

According to the data provided by INSSE, Suceava was the county with the highest volume of harvested wood, 2.600 m³, followed by Neamt county, which was 1.241 m³, Harghita 983,9 m³, Mures 921,2 m³, Arges 794,3 m³, Caras-Severin county 779,7 m³, Maramures 707,2 m³ and Vrancea county, with a volume of 568,4 m³.

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