

FOREST MANAGEMENT IN THE PRESENT CONTEXT OF THE FOREST ADMINISTRATION IN ROMANIA

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Abstract:

Although mankind depends on the forest in so many ways (ecological, social, economic), its destruction continues, the negative impact of illegal cutting increasing with the shrinking of the forest area. The study presented in this paper aims to illustrate the evolution of the forest area and timber volume harvested in Romania, during the period 1990-2013, as well as the interdependence between the two variables. In the analysis and interpretation of data was used a linear regression model. It is also analyzed the situation of illegal cutting of trees in the forests of Romania between 2009-2012. These, alongside uncontrolled deforestation and the insufficient level of reforestation, are the most pressing problems of forests in Romania. As part of the forest fund management, there are presented a series of measures and actions to combat the phenomena which has negative effects on forests.

Keywords: forest fund, illegal cutting, regression, correlation

JEL Classification: C22, Q23

1. Introduction

Decisive factor in maintaining the climate balance, the ecological and the hydric one, forests have experienced over time a continuous degradation, their improper exploitation having the worst medium and long-term consequences.

Thus, one of the causes of global climate change is the poor management of forests. About 20% of the greenhouse gases emissions are caused by worldwide deforestation, according to the IPCC report (Intergovernmental Panel on Climate Change): "Climate Change 2007" (14).

In the new report "Climate Change 2014: Mitigation of Climate Change" (15) compiled by the IPCC it is stated that despite all efforts, global emissions of greenhouse gases continued to increase, reaching in 2010 unprecedented values . Floods, landslides, soil erosion are just some of the phenomena with major implications for human communities caused by deforestation. Therefore, it is necessary to take measures for the conservation and sustainable development of existing forests and increasing forest area through afforestation. In the early 90s the concept of forest management appeared as an objective necessity for the sustainable development of society.

According to the H1 resolution from Helsinki of the Second Ministerial Conference on the Protection of Forests in Europe (1993), "sustainable management" means the "stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems"(24).

When there is a balance between the environmental component, the social and the economic one, it is about a responsible forest management (21). As a guarantee of responsible forest management, with international recognition, Romania promotes forest management certification system FSC (Forest Stewardship Council) (22).

This certification involves running an audit by accredited certification bodies, based on a standard containing 10 principles and 56 criteria, which "describe in general the elements and rules of a proper management from the ecological point of view, which brings social benefits and which is economically viable "(22).

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Although certification is a voluntary process, requests for a FSC certificate are becoming more numerous, primarily because the certified forest products market grew, FSC certified wood having a higher sales price than the usual one. The validity of the FSC certificate is of 5 years, during which annually shall be made at least one external audit. According to Eurostat, in 2012, in Romania, forests and other wooded land covered about 36% of the area with the European average of 38% (12).

Currently, in Romania there are 33 state forests (RNP ROMSILVA) and private ones (forest districts) FSC certified, according to data provided by the FSC (23), representing approximately 37% of the total forest area.

2. Empirical research

In January 2013, WWF (World Wildlife Fund) released a study in partnership with Ipsos Research, indicating pollution and deforestation as the main environmental problems experienced by Romanians (13).

According to the Forest Code (Law no. 46/2008) (16), the national forest fund represents the total area of forests, of lands meant for afforestation, of those serving the needs of crops, production and forest administration of ponds, brooks as well as of other areas intended for forestry and non-productive lands included in forest arrangements on the 1st of January 1990 or later on included, under the law, no matter of ownership right. Harvested wood volume represents wood volume (gross volume) harvested until the end of the year, meant for economic operators and population supply (17). Below is the evolution of the forest fund area and timber volume harvested in Romania, during 1990-2013.

Table 1. Surface of the forest fund

Year	Surface of the forest fund (Thousand hectares)	Year	Surface of the forest fund (Thousand hectares)
1990	6371	2002	6387.8
1991	6367.6	2003	6368.5
1992	6368.2	2004	6382.2
1993	6366.9	2005	6390.6
1994	6369	2006	6427.7
1995	6368.8	2007	6484.6
1996	6365.7	2008	6469.9
1997	6367.3	2009	6494.7
1998	6367.1	2010	6515.1
1999	6367.3	2011	6521.8
2000	6366.5	2012	6529.1
2001	6366.8	2013	6538.5

Source: <http://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=AGR301A>

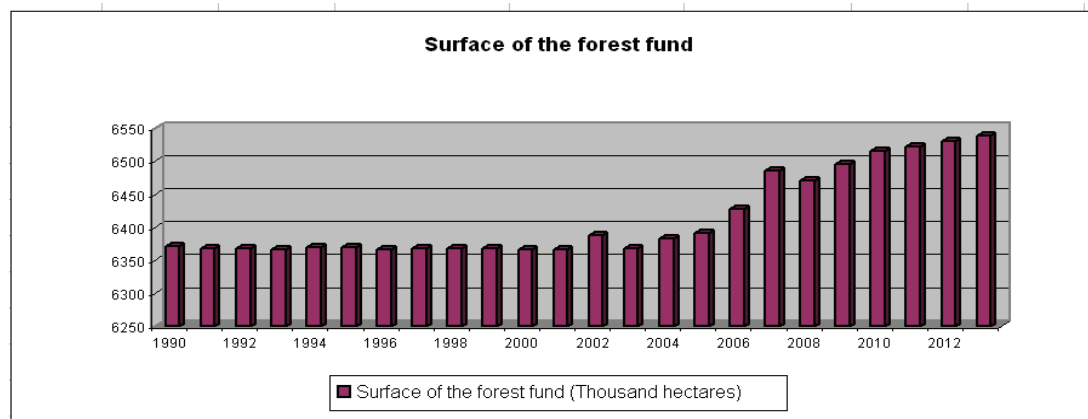


Figure 1. Surface of the forest fund

Source: Created by author based on the values in Table 1

From (Figure 1) it is observed the fluctuating evolution of the forest fund area in the period 1990-2013, the trend being ascending.

Since 1991, lower values of the forest fund area (compared with 1990) are the result of a "legislative and economic situation utterly unfavorable for the forest " (18), of which we mention:

- enforcement of Law no. 18/1991 – The Land Law (plus amendments by Law no. 169/1997): restitution of forest land led to massive cutting of private forests. Thus, "in the period 1990-2012 the forest fund area - state property decreased by 3028762 ha in restitution to individuals or legal entities, following the application of the laws of Land" (6);
- Lack of legal framework: Law no. 2/1987 on the conservation, protection and development of forests (of the socialist units) has governed the forest activity until 1996, thus lacking a legal framework to establish the management of private forests;
- Very low fines provided in Law no. 2/1987 (5), for the illegal cutting of trees;
- Willingness of owners to obtain immediate benefits, the forests representing only a quick source of income;
- local authorities passivity.

Only in 2000, by Law no. 31/2000 (19) regarding the establishing and sanctioning of forest contraventions, were significantly increased fines for illegal cutting of trees and transport of timber or other forest products without the legal documents of specific provenance.

Table 2. Volume of harvested wood

Year	Volume of harvested wood (Thousand cubic meters)
1990	16649
1991	15377.1
1992	14419.3
1993	13590.7
1994	12942.1
1995	13812.7
1996	14803.3
1997	14508.5
1998	12642
1999	13718.1
2000	14284.7
2001	13410.3
2002	16383.1
2003	16691.5
2004	17082.1
2005	15671.3
2006	15684
2007	17237.6
2008	16704.6
2009	16519.9
2010	16991.6
2011	18705
2012	19081.2
2013	19063.8

Source: <https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=AGR306A>

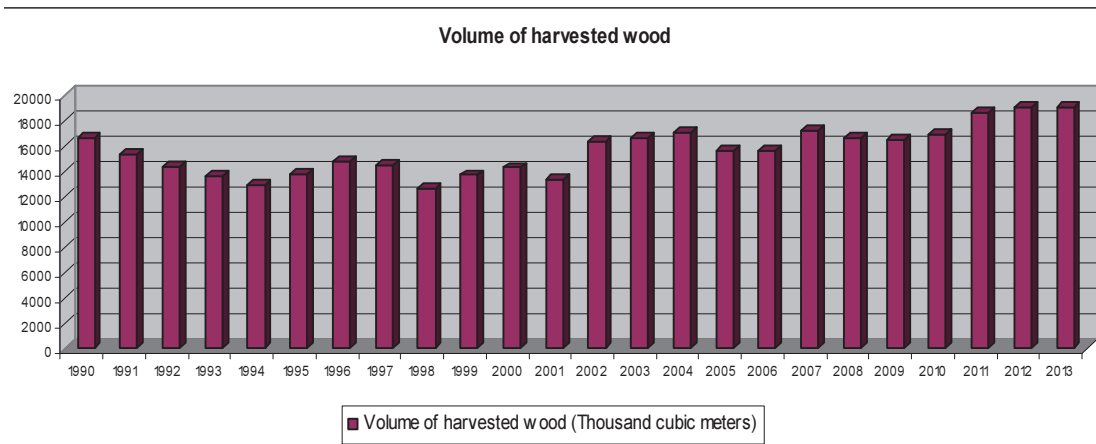


Figure 2 Volume of harvested wood

Source: Created by author based on the values in Table 1

Analysis of data on the volume of timber harvested in the period 1990-2013 highlights the ascending trend, despite the fluctuating evolution. Thus, the intervals 1995-1996, 1999-2000, 2002-2004, 2006-2007, 2009-2012 show increases in the volume of harvested wood. The maximum volume of harvested timber is reached in 2012.

An issue of interest is that of the interdependence between forest fund area and the volume of harvested wood in Romania, during 1990-2013.

In order to establish this interdependence we use Data Analysis from the Tools menu of Microsoft Excel spreadsheet program.

Table 3 Results of the statistical correlation method

	Surface of the forest fund	Volume of harvested wood
Surface of the forest fund	1	
Volume of harvested wood	0.800745692	1

Source: Created by author based on the values in Table 1 and Table 2

Correlation coefficient allows to set direction and intensity of the relationship between the two variables (Savu and Bursugiu, 2013). Since the correlation coefficient between the time series of forest fund area and timber volume harvested in Romania has the value $r = 0.8007$, we can say that the two variables show a strong positive correlation.

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.800746
R Square	0.641194
Adjusted R Square	0.624884
Standard Error	1155.283
Observations	24

Figure 3. Summary of data processing

Source: Created by author based on the values in Table 1 and Table 2

The coefficient of determination (R Square) being of 0.641194 indicates that the volume variation of harvested wood is explained at a rate of 64% by the variation of the forest fund area.

To counter the effect of increasing the coefficient of determination by including more variables in the model, it is determined the adjusted value of determination coefficient (Adjusted R Square), here with the value of 0.624884.

ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	52472121.11	52472121	39.31441323	0.00000260691			
Residual	22	29362937.65	1334679					
Total	23	81835058.76						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-134689.23	23980.72881	-5.616561	0.00001201	-184422.2179	-84956.24	-184422.22	-84956.243
X Variable 1	23.443683	3.738952491	6.270121	0.00000261	15.68957046	31.197796	15.6895705	31.1977961

Figure 4. The results of regression method

Source: Created by author based on the values in Table 1 and Table 2

Using the information in the column Coefficients we build the following linear model of simple regression: $Y = a_0 + a_1X + \varepsilon$. (1)

$$\text{Results: } Y = -134689.23 + 23.4436833X, \quad (2)$$

where

Y = volume of harvested wood in Romania during 1990-2013
(endogenous variable, resultative)

X = forest fund area in Romania during 1990-2013
(exogenous variable, explanatory)

ε = random variable that summarizes the influence of other variables (unspecified in the model) on the volume of harvested wood

For the independent variable value equal to zero is obtained

$$Y = a_0 = -134689.23 \quad (3)$$

To an increase in forest fund area of a thousand hectares, the harvested timber volume will increase by an average of 23.4436833 thousands cubic meters.

To validate the model, in the ANOVA table (Figure 4) there are calculated the values for the F-test, respectively the significance limit. Since F is 39.31441323 and Significance F is 0.00000260691 (lower than 0.05) we conclude that the regression model is valid and we can use it to analyze the relationship between the two variables.

The lack of correlation between the independent variable and the residue is shown in (Figure 5) and it means that the model is well chosen.

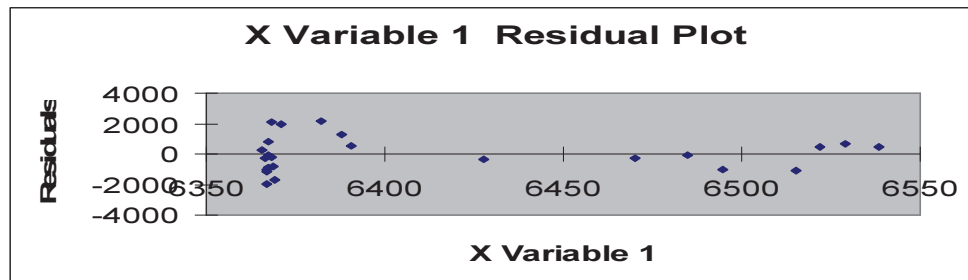


Figure 5. Independent variable diagram versus residue

Source: Created by author based on the values in Table 1 and Table 2

Although from official statistics, in 2013 the forest fund area was 167.5 thousands hectares wider than in 1990, in reality the situation is different, the number of deforested areas increasing from year to year. This is due, on one hand, to illegal cutting of trees and on the other hand to the fact that by law, in the forest fund, besides land surfaces covered by forests, there are also included the ponds, stream beds, lands under forest and unproductive, etc.

According to the Audit Report on “Patrimonial situation of forest fund in Romania during 1990 - 2012” by the Court of Accounts (6), the volume of illegal cutting in state forests during 1990-2012 was of 2508.7 thousands cubic meters.

Yearly situation of illegal cutting in state forests is shown in (Figure 6).

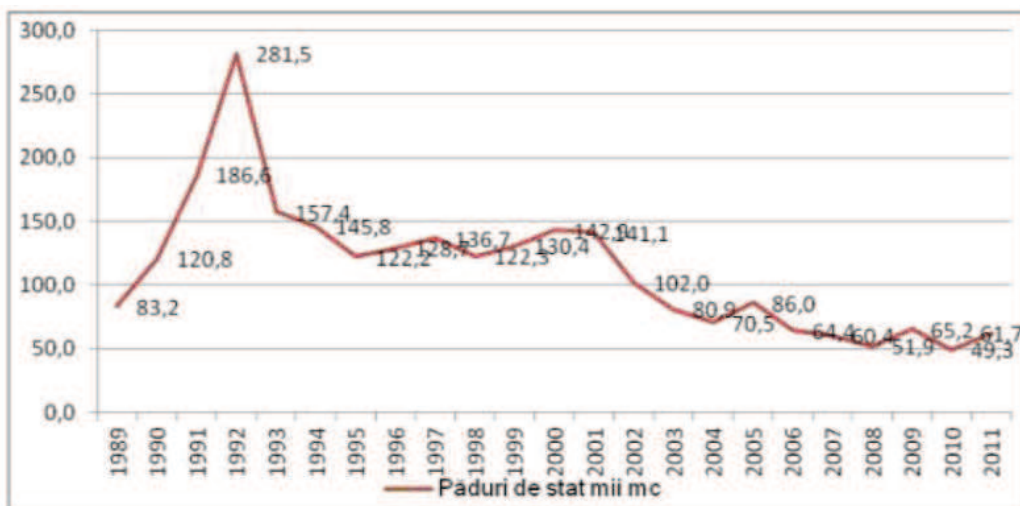


Figure 6. The situation of illegal cutting in state forests

Source: The Audit Report on “Patrimonial situation of forest fund in Romania during 1990 - 2012”, <http://www.curteadeconturi.ro/publicatii/economie7.pdf>

According to the same report, illegal cutting of timber were made, in many cases, due to negligence or abuse of forestry stuff.

During 2000-2011, the volume of illegal cutting in private forests managed based on contracts by R.N.P. ROMSILVA was of 194600 cubic meters (6).



Figure 7. The situation of illegal cutting in private forests

Source: The Audit Report on “Patrimonial situation of forest fund in Romania during 1990 - 2012”, <http://www.curteadeconturi.ro/publicatii/economie7.pdf>

According to the Greenpeace report (7) on the illegal cutting of trees in the forests of Romania during 2009-2011, at the national level, there were 31456 cases of illegal cutting of trees that have resulted in sanctions, representing approximately 30 cases / day. For 2012, the Greenpeace report (8) specifies a number of 19500 cases of illegal cutting of trees resulted in sanctions, representing approximately 53 cases / day.

Data recorded for the first 10 counties with most cases of illegal cutting during 2009 - 2011 and their evolution in 2012 are shown in (Figure 8).

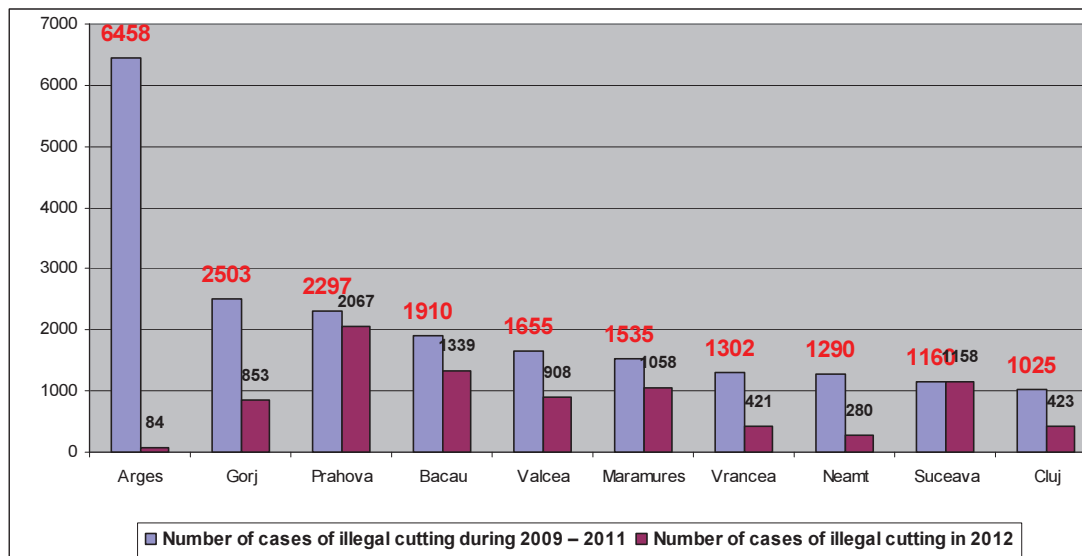


Figure 8. Counties with most cases of illegal cutting in 2009-2011 and their evolution in 2012

Source: Created by author based on data from Greenpeace reports www.greenpeace.org

(Figure 9) shows the top counties with most cases of illegal logging in 2012.

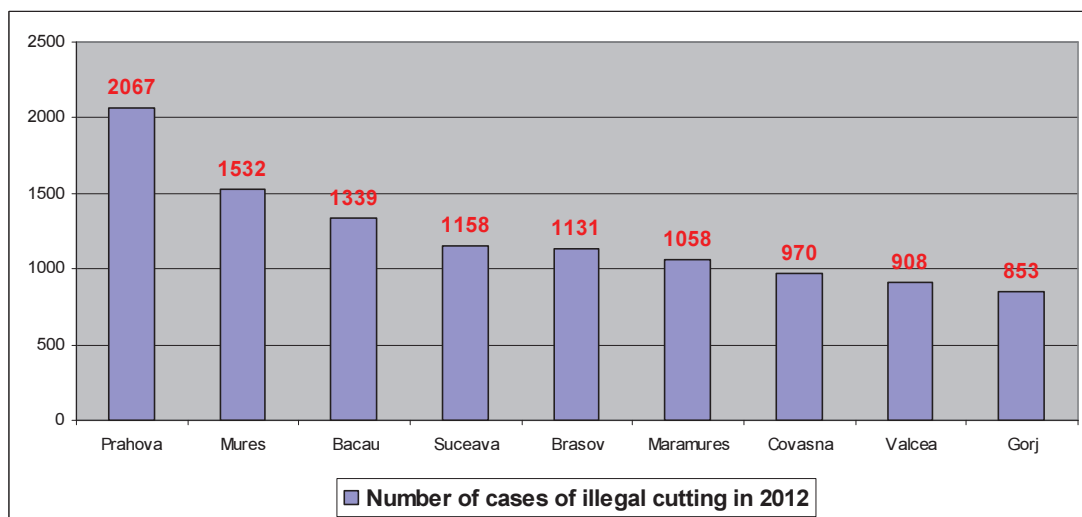


Figure 9. Counties with most cases of illegal cutting in 2012

Source: Created by author based on data from Greenpeace reports www.greenpeace.org

According to The Department for Water, Forests and Fisheries (established in the Ministry of Environment and Climate Change by G.D. no. 428/2013), the trend of increase in illegal cutting has also continued in 2013.

3. Conclusions

In his book "History of Romanian forest" (Giurescu, 2004), academician Constantin C. Giurescu noted: "the essential question that arises today is achieving a constant balance between the annual rate of forest cutting and that of its growth, by increasing is taking into account only natural growth, useful, valued, apart from afforestation".

Although figures presented are worrying, the phenomena is much wider, statistics including only official figures (the confiscated wood and caught offenders).

Among the effects of these illegal cutting we mention: flooding (with devastating effects, often on local communities and infrastructure), soil degradation through erosion and landslides (because of a wrongful cutting of timber on steep land or river bed), clogging waterways, climate change (drought and fires caused by drought), degradation of habitats.

Currently, in the forest management, there are distinguished the following trends (20):

- a) The globalization of policies and institutions in response to the increasing interest of the international community on the status of forest resources;
- b) Improving forest management;
- c) Expanding the circle of participants in the decision-making process in forest management.

Measures and actions to combat negative phenomena affecting forests include:

- National Forest Strategy 2014-2020, which aims "to ensure sustainable management of the forestry sector in order to increase quality of life and ensure the present and future needs of society in a European context" (10) .

- The plan of the Department of Waters, Forests and Fisheries on preventing and combating illegal cutting, including (10):

- Intensifying the actions of control;
- The draft law amending and supplementing the Forest Code (Law no. 46/2008);
- The draft law amending and supplementing Law no. 171/2010 regarding the establishing and sanctioning of forestry offenses;
- Harmonization of national legislation with that of the European Union regarding the field;

• Monitoring system in real-time of traceability of timber (the goal being reducing illegal cutting of timber and tackling tax evasion in the field) which will become mandatory across the country, from October 8, 2014 (11)

- National Afforestation Program
- National Program to establish protective forest belts on highways and on national roads
- Measures for training forest consciousness, action recovery and reconstruction of tree and forest, significantly affected by illegal cutting, is a hard work, of long continuance, very expensive and often unreliable (Florescu and Spârche, 2012)

- Support for small woodland owners, individuals, in their legal obligations incumbent on forest guard (currently, for about 500000 ha of forest there are not provided security services)

- Extension of forest roads
- Increasing the number of FSC certified forests, this bringing a number of benefits to producers of raw certified materials and also to companies producing certified local products, to the employees in the forestry sector and to local communities.

Bibliography:

1. Florescu, I., Spârche, G. (2012). *Considerații privind influența lucrărilor de exploatare a lemnului asupra regenerării pădurii*, Revista Pădurilor, Vol.127, Nr.4, pg.14-19.
2. Giurescu, C., C. (2004). *Istoria Pădurii Românești din cele mai vechi timpuri până astăzi*. Ediția a treia, București, Editura Orion.
3. Savu M., Bursugiu M. (2013). *Correlation Between Economic Growth And Unemployment*, *Annals - Economy Series*, Constantin Brâncuși University of Târgu Jiu, vol. 3, pages 195-198
4. Cartea Pădurarului, Regia Națională a Pădurilor, 1997
5. <http://www.legex.ro/Legea-2-1987-850.aspx>
6. <http://www.curteadeconturi.ro/publicatii/economie7.pdf>

7. <http://www.greenpeace.org/romania/Global/romania/paduri/Despaduririle%20din%20Romania/Taierile%20ilegale%20de%20arbori%20in%20padurile%20din%20Romania%20%282009-2011%29.pdf>
8. <http://www.greenpeace.org/romania/ro/campanii/paduri/activitati/taieri-ilegale-arbori-2012/>
9. <http://www.curierulnational.ro/Eveniment/2014-01-13/Peste+2,3+mil.+euro,+amenzile+date+pentru+taierea+ilegala+a+padurilor&hl=Curierul%20National&tip=toate>
10. <http://www.cdep.ro/interpel/2014/r4282A.pdf>
11. <http://apepaduri.gov.ro/radarul-padurilor-o-promisiune-onorata/>
12. <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>
13. http://romania.panda.org/resurse/comunicate_de_presa/?207399/Studiu-WWF-Romnii-romnii-sunt-tot-mai-ngrijorai-de-starea-mediului-nconjurator
14. http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm
15. <http://www.ipcc.ch/report/ar5/wg3/>
16. http://www.clr.ro/rep_htm/L46_2008.htm
17. <https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=AGR306A>
18. <http://www.itrsvsuceava.ro/Site/sinteze02.htm>
19. http://www.foresteuropa.org/docs/MC/MC_helsinki_resolutionH1.pdf
20. <http://www.moldsilva.gov.md/public/files/publication/RAPORT.pdf>
21. <http://propark.ro/images/uploads/file/publicatii/Management%20Forestier%20Responsabil%281%29.pdf>
22. <http://www.certificareforestiera.ro/>
23. www.info.fsc.org
24. <http://www.legex.ro/Legea-31-2000-20521.aspx>